

Report of the New Hampshire Exotic Aquatic Species Program



2002-2003

Fall 2004



**Report of the
New Hampshire Exotic Aquatic Species Program
2002-2003**

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Executive Summary

This report summarizes the spread and distribution of exotic aquatic species in New Hampshire and the activities of New Hampshire's Exotic Aquatic Plant Program to control these species. Program history is summarized, and activities that occurred from 2002 through 2003 are described in detail.

“Exotic aquatic species” are plants or animals that are not part of New Hampshire's native aquatic flora and fauna. Since the first exotic aquatic plant infestation in New Hampshire was discovered in 1965 in Lake Winnepesaukee, exotic aquatic plant infestations have increased to a total of 64 infestations in 60 waterbodies in 2003. Species present include variable milfoil (53 waterbodies), Eurasian milfoil (3 waterbodies), fanwort (7 waterbodies), water chestnut (1 waterbody) and Brazilian elodea (1 waterbody). Most of these exotic plants can propagate by fragmentation as well as by seed.

Exotic aquatic plant fragments can easily become attached to aquatic recreational equipment, such as boats, and can spread from waterbody to waterbody through transient boating activities. Infestations can have detrimental effects on the ecological, recreational, aesthetic, and economic values of the state's precious surface waters, limiting use of the waterbodies and decreasing shorefront property values by as much as 10-20% according to a UNH study (Halstead, et al., 2001).

Since its inception in 1981 with the passage of RSA 487:15, the Exotic Aquatic Plant Program has grown to become a cooperative effort among state agencies, lake organizations, and concerned citizens. At the state level, this involves a partnership among the New Hampshire Department of Environmental Services (DES), the Department of Fish and Game, the Department of Safety, and the Department of Agriculture, Markets, and Foods to prevent the spread of exotic plants to new waterbodies and to monitor and treat infestations. Many lake associations and other non-profit organizations, such as the New Hampshire Lakes Association and individual lakes associations, participate in monitoring, education, and control efforts.

Recent Program Activities

Program activities include five focus areas: 1) Prevention of new infestations through education and outreach; 2) monitoring for early detection of new infestations; 3) control of new and established infestations; 4) research towards new control methods; and 5) regional/national cooperation with other exotic species programs.

Education and Outreach: Between 2002 and 2003, 93 presentations and seminars were given to lake associations and professional organizations, and several live radio broadcasts and local news media events were also conducted. A new web page was developed in 2000, and over 200 boat access sites now have colorful signs to inform boaters about potential infestations in a waterbody and how to avoid spreading aquatic plant species to new locations or waterbodies. Two videos were also produced in cooperation with the New Hampshire Lakes Association on milfoil and other exotic aquatic plants. DES also participated in filming footage for a Quest show on Maine and New Hampshire Public Television entitled “BioInvasions.”

Monitoring for Early Detection: Between 2002 and 2003, monitoring activities included macrophyte surveys by DES staff of 80 lakes. The Weed Watcher Program, coordinated by DES, recruits volunteers to monitor their waterbodies and to report suspicious plants to DES for immediate identification. In 2003, there were over 300 Weed Watchers monitoring over 100 waterbodies for early detection of exotics.

Control Activities for New and Existing Infestations: Control activities decreased from 42 individual projects in 2002, to 39 in 2003. Control measures for new, small infestations include hand pulling or benthic barriers, and may include designation of a Restricted Use Area in the vicinity of the infestation. Larger, established infestations are usually controlled with herbicides. Project activities for 2002 included 27 herbicide applications, 6 benthic barrier installations, 6 hand-pulling activities, 2 Restricted Use Area designations, and 1 harvesting experiment. Project activities for 2003 included 20 herbicide applications, 7 benthic barrier installations, 8 hand-pulling activities, the establishment of 3 Restricted Use Areas, and 1 harvesting experiment.

Research: Initiating and participating in research activities is a key element in the Exotic Aquatic Plant Program. As variable milfoil is not a common nuisance species throughout the United States, little research has been conducted on the plant's biology, ecological relationships, and potential control strategies. By working with local academic institutions, such as Dartmouth College and the University of New Hampshire, as well as field-testing various hypotheses on New Hampshire waterbodies, DES is working towards finding solutions to exotic aquatic plant infestations. DES also stays informed about what other states are doing to manage exotic aquatic species, as well as about emerging technologies in the field of management.

Regional Cooperation: DES has worked on a regional level to standardize the key legislation and education initiatives between the New England states. To date, New Hampshire, Vermont and Maine have state exotic species legislation in place. Prohibition of exotic species sale and transport is much more effective on a regional basis than state-by-state. If a standardized list of exotic plants can be prohibited in New England and neighboring states, the likelihood of success in preventing the spread of these species to new waterbodies is increased.

The DES Exotic Aquatic Plant Program was funded from a fee of \$1.50 per boat registration until January 1, 2003. Passage of new legislation increased the revenue to \$4.50 per boat registration. The additional \$3 is used to fund the Milfoil and Other Exotic Aquatic Plant Prevention and Research Grant Fund. Monies from the \$1.50 fee are used to fund herbicide applications, educational materials, and administrative costs.

Long Term Goals

The goals of the Exotic Aquatic Plant Program are to limit the further spread of exotic aquatic species, control new and existing infestations, and to research new ways to contain or limit the spread of these species. Objectives in the five focus areas are:

Education and Outreach: Foster increased partnerships among public and private lake associations, state agencies, regional groups, and other aquatic interests to provide and

disseminate innovative and proactive educational materials that inform the public about exotic aquatic species, how they are spread, and how they are controlled.

Monitoring for Early Detection: Expand the Weed Watcher Program and coordinate training activities with volunteer monitors. Map infestations using global positioning systems to more accurately document and track the occurrence and distribution of infestations over time. Develop DNA gene sequencing methods for positive identification of variable milfoil during all life stages.

Control Activities for New and Existing Infestations: Develop a streamlined process, including appropriate monitoring and environmental assessment, for conducting herbicide applications.

Research: Conduct research on long-term control methods and potential means for eradication of exotic aquatic plants. Continue Dartmouth College research to develop DNA gene sequencing methods for positive identification of variable milfoil during all life stages. Continue University of New Hampshire studies to further research the economic impacts of exotic plant infestations, such as impacts on New Hampshire lakefront property values.

Regional Cooperation: Continue to develop regional approaches for the northeastern states for education, outreach and monitoring.

Looking to 2004 and beyond, DES would like to promote programs that meet the challenge of preventing new exotics infestations, controlling existing ones, and researching new techniques for control and even eradication of exotic aquatic species.

This year the New Hampshire Lakes Association (NHLA) has again partnered with the program to secure federal funding in 2004 for enhanced education and outreach, as well as grants to local organizations for public access site monitoring of boats, motors, trailers and equipment.

In its 2004 session, the New Hampshire General Court is also considering legislation that seeks to evaluate alternative control methods for exotic aquatic plants, and to evaluate current methods of control for their cost effectiveness.

1. PROGRAM OVERVIEW

1.1 Purpose and Overview

This report describes activities of New Hampshire's Exotic Aquatic Plant Program during 2002 and 2003. It also summarizes the spread and distribution of exotic aquatic plants in New Hampshire and the program history.

The primary purpose of New Hampshire's Exotic Aquatic Plant Program, authorized by RSA 487, is to "prevent the introduction and further dispersal of exotic aquatic weeds and to manage or eradicate exotic aquatic weed infestations in the surface waters of the state" (RSA 487:17, II). The program focuses on submerged exotic aquatic plants, including variable milfoil (*Myriophyllum heterophyllum*), Eurasian milfoil (*Myriophyllum spicatum*), fanwort (*Cabomba caroliniana*), Brazilian elodea (*Egeria densa*), Hydrilla (*Hydrilla verticillata*) and water chestnut (*Trapa natans*). Other exotic plants, such as common reed (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*), although also of concern, are not addressed by the Program because they are not submerged aquatic plants.

The program, initiated in 1981, now has five focus areas: 1) Prevention of new infestations, 2) Monitoring for early detection of new infestations, 3) Control of new and established infestations, 4) Research towards new control methods with the goal of reducing or eliminating infested areas, and 5) Regional cooperation. The program is funded through a \$5 fee derived from boat registrations in New Hampshire. Of that \$5 fee, a total of \$4.50 is dedicated to tasks and projects associated with exotic aquatic plants (more details on revenues and expenditures can be found in Section 3).

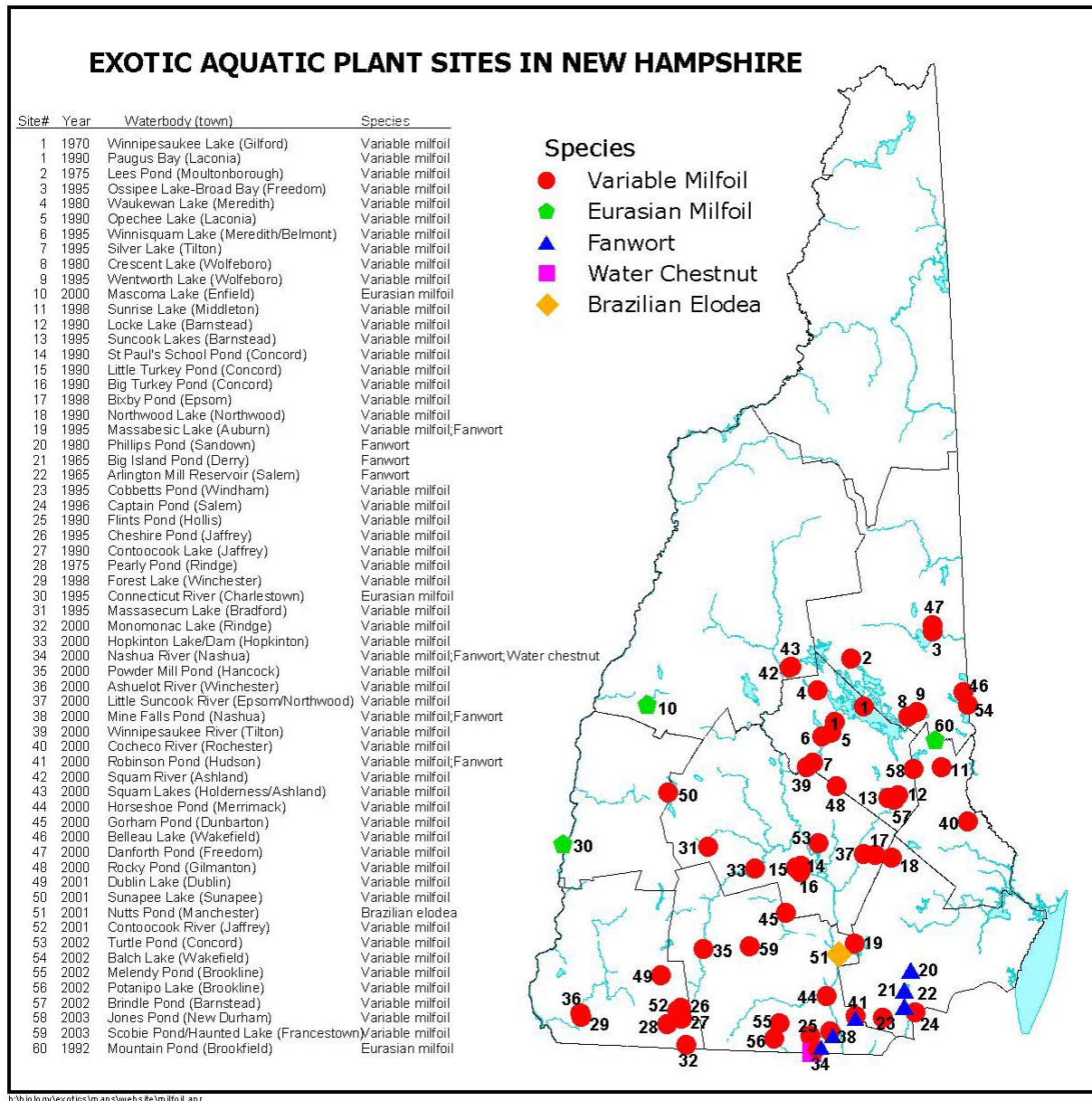
1.2 Problem Scope

"Exotic aquatic plants" are plants living in lakes, rivers, or other waterbodies that are not part of New Hampshire's native aquatic flora. These plants, sometimes called 'nuisance' or 'invasive' species, can grow and reproduce rapidly, taking over large portions of waterbodies and impairing boating, recreation, and aesthetics, as well as posing a threat to native species. Recent studies by the University of New Hampshire have documented 10-20% declines in lakefront property values attributed to the presence of exotic aquatic plants (Halstead et al., 2001).

Exotic aquatic plants propagate primarily by fragmentation, a process by which a piece broken from a mature plant can grow roots, settle in a new location, and begin growth of a new plant. Plant fragments, most often generated by human activity, can easily become attached to boats, trailers, fishing equipment, or diving gear, thus spreading from waterbody to waterbody. Recreational boat registrations in New Hampshire have grown over 20% since 1997, to include more than 100,800 boats registered in 2003. With the increase in water-based recreational activities, there is increased potential for the spread of exotic aquatic plants to new locations and waterbodies by boats and other water-related recreational equipment.

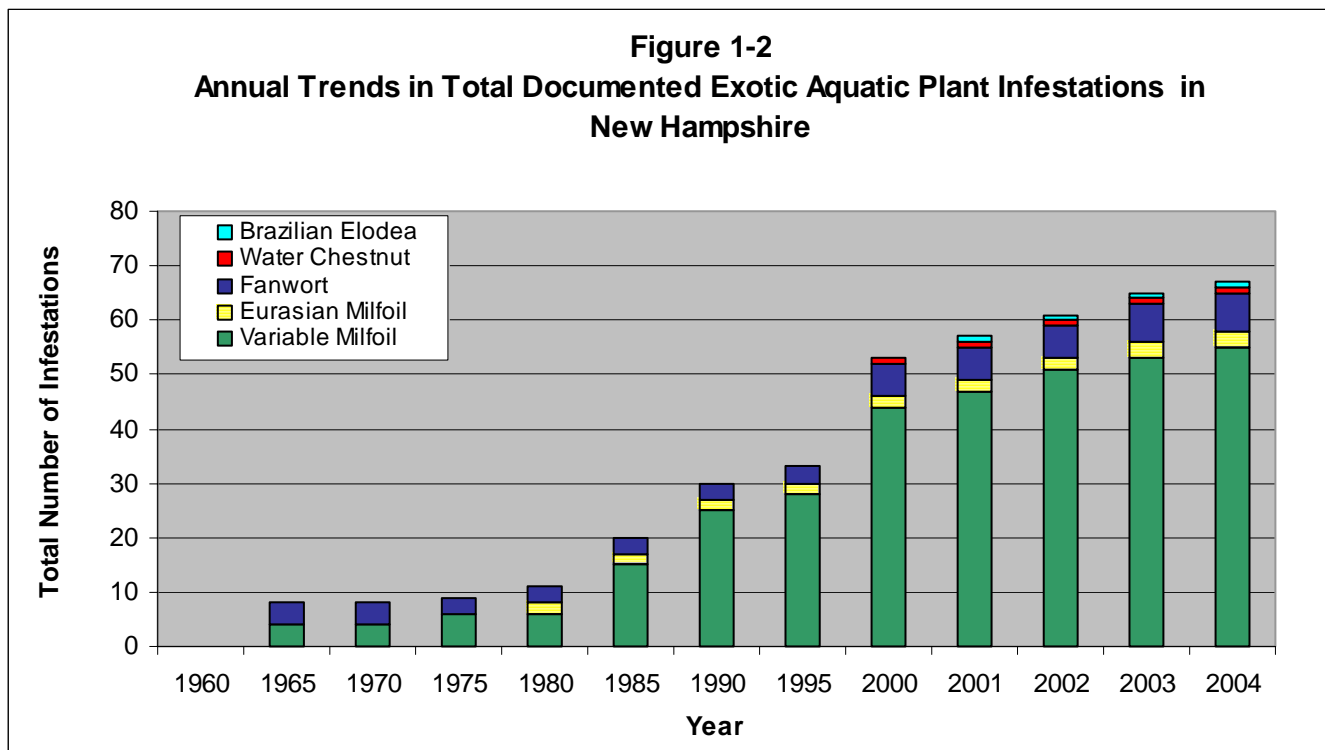
The first exotic aquatic plant infestation in New Hampshire was discovered in 1965 in Lake Winnepesaukee. Since then, exotic aquatic plant infestations have increased to a total of 65 infestations on 60 waterbodies in 2003. Figure 1-1 shows the current distribution of exotic aquatic plant infestations in New Hampshire.

Figure 1-1
List of Exotic Plant Infestation as of Fall 2003



Four fanwort infestations were documented in the 1960s, but due to a lake dredge during the early 1980s, fanwort in Milville Lake was eradicated, leaving only three infestations. Other fanwort populations were documented in the Nashua River and Mine Falls Pond, Nashua, and in Robinson Pond, Hudson, in the late 1990s, bringing the total to six infestations. A new infestation of fanwort was found in 2003, adjacent to the boat launch area of Lake Massabesic in Auburn, bringing the tally to seven infestations. Water chestnut, first found in New Hampshire in 1998, is currently documented only in the Nashua River. During the summer of 2001, the first New Hampshire infestation of Brazilian elodea (*Egeria densa*) was identified in Nutts Pond, Manchester. Four waterbodies now have more than one species of exotic aquatic plants: Mine Falls Pond, Nashua (milfoil and fanwort), Robinson Pond, Hudson (milfoil and fanwort), Lake Massabesic, Auburn (milfoil and fanwort) and the Nashua River, Nashua (milfoil, fanwort and water chestnut).

Figure 1-2 depicts the trend of exotic aquatic plant infestations from 1960-2003.

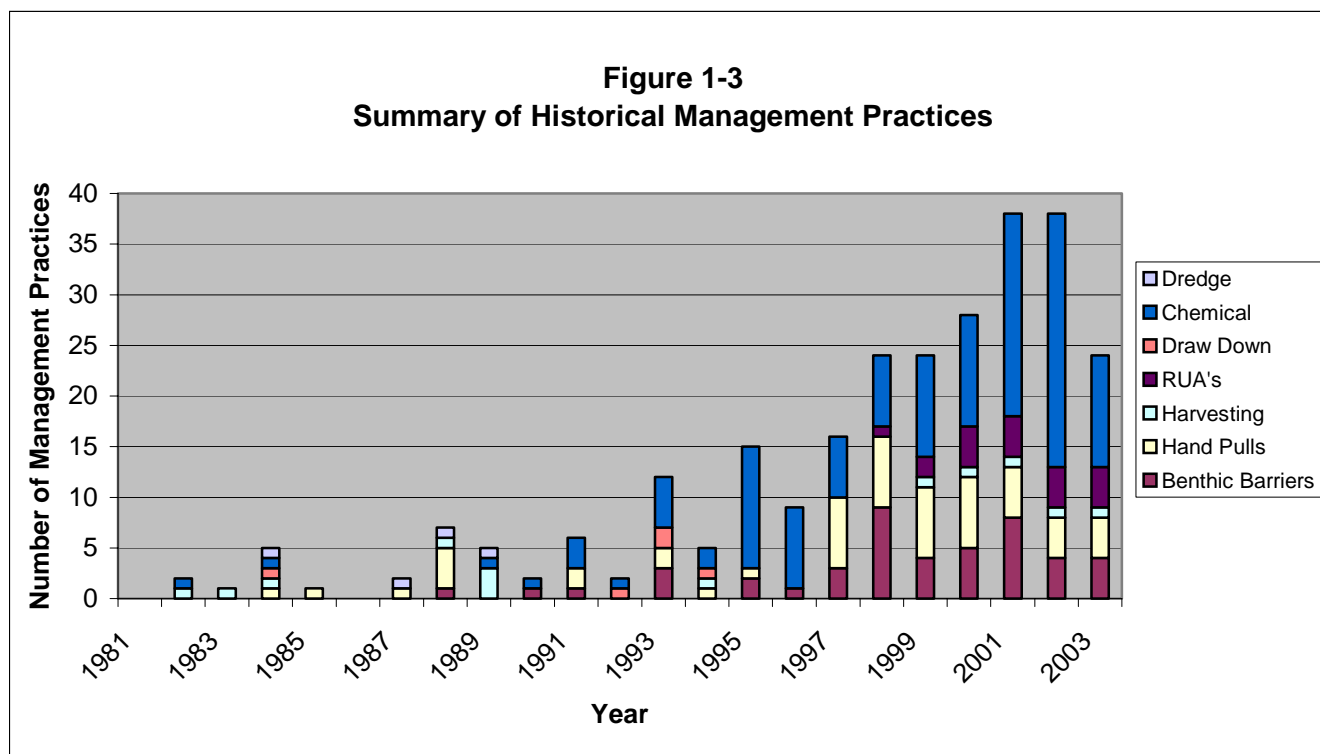


1.3 Program History

Activities associated with the control of exotic aquatic plants formally began in 1981 with the passage of an exotic plant control law, RSA 487:15. In 1998, RSA 487:16-a was adopted, establishing the current legislative basis for the Exotic Aquatic Plant Program. In September of 1999, Chapter Env-Ws 1300 was adopted, further defining the provisions of the exotic species legislation, and listing 14 aquatic plants as prohibited in New Hampshire. Copies of the program legislation and regulations are included in Appendix 1. Table 1-1 provides a summary of key events and activities that have occurred from the beginning of the program in

1981 to 2003, and a more complete chronology of program events and activities is provided in Appendix 2.

DES has been actively working to control growths of milfoil, however, since the 1960s. A variety of control projects have been conducted on lakes and ponds each year, with an increasing number of control projects conducted annually over the years. Figure 1-3 summarizes the historical trends in control practices since 1981.



1.4 Partnerships

The scope of the Exotic Aquatic Plant Program has grown over time as public awareness of exotic aquatic plants has grown with the number of infestations. The program employs a multi-faceted approach to control the spread of exotic aquatic plants, which has developed and evolved with increased partnership among state agencies, local government, and volunteer groups. The shared expertise, capacity, and knowledge base of the program activities built through this partnership are key to program success. Many agencies and groups participate in program activities, including the Fish and Game Department, the Department of Safety, the Department of Agriculture, and the New Hampshire Lakes Association. The roles of the cooperating organizations are described in Table 1-2.

Table 1-1
Key Events in the Exotic Aquatic Plant Program: 1981-2003

| Year | Activity/Event |
|------|--|
| 1981 | ➤ Exotic Weed Legislation (RSA 149-F:3) enacted |
| 1982 | ➤ Citizen Aquatic Weed Control Advisory Committee formed by a group of volunteers |
| 1984 | ➤ Milville Lake dredged to control a fanwort infestation |
| 1985 | ➤ Exotic plant control funding suspended due to changes in legislation. No control techniques employed this year |
| 1986 | ➤ Exotic plant control funding became available once again due to legislative action |
| 1987 | ➤ \$45,000 grant awarded to the Aquatic Biology Department at the University of New Hampshire, Durham to conduct a literature search to determine adequate control techniques for exotic aquatic plants |
| 1988 | ➤ Weed Watcher Program initiated |
| 1991 | <ul style="list-style-type: none"> ➤ Discovery of larval form of <i>Paraponyxa allionealis</i> (an aquatic moth) on <i>Myriophyllum heterophyllum</i> (variable milfoil) in Lees Pond, Moultonboro, which led to research on the possible use of this organism as a biological control for milfoil. The insect was not target specific, so it is not a good biological control option. ➤ Exotic aquatic plants sign developed for posting at public access sites |
| 1992 | ➤ First infestation of <i>Myriophyllum spicatum</i> (Eurasian milfoil) discovered growing in Mountain Pond, Brookfield, New Hampshire |
| 1993 | <ul style="list-style-type: none"> ➤ Aquatic plant workshop held at DES for lake association members and volunteers ➤ Presentation on exotic plants given to BASS Master Associations |
| 1995 | ➤ Weed Watcher Wheel developed for use in identification of exotic plants |
| 1996 | ➤ Exotic plant identification workshop held for Fish and Game Department |
| 1998 | <ul style="list-style-type: none"> ➤ RSA 487:16-a became effective on January 1, 1998, increasing funding for the Exotic Species Program. ➤ Env-Ws 1300 adopted on September 5, 1998 ➤ Fourteen species of exotic aquatic plants listed as prohibited plants in rules ➤ A mailing to 700 aquatic plant retailers in New Hampshire conducted to inform them of prohibitions associated with 14 listed exotic aquatic plants ➤ First Restricted Use Area (RUA) established on Lake Massasecum, Bradford ➤ <i>Trapa natans</i> (water chestnut) found in Nashua River, Nashua |
| 1999 | ➤ <i>Myriophyllum spicatum</i> (Eurasian milfoil) first identified in Lake Mascoma, Enfield |
| 2000 | ➤ RSA 487:16-b relative to exotic aquatic plant penalties adopted |
| 2001 | <ul style="list-style-type: none"> ➤ Amendment to Env-Ws 1304.01(a) passed to modify provisions for the use of Restricted Use Areas on waterbodies with limited infestations of exotic aquatic plants ➤ First infestation of <i>Egeria densa</i> (Brazilian elodea) found in New Hampshire in Nutts Pond, Manchester ➤ Restricted Use Areas installed in Lake Sunapee and Squam Lake |
| 2002 | <ul style="list-style-type: none"> ➤ Significant expansion of Weed Watcher Program ➤ Pilot Lake Host Program Launched by New Hampshire Lakes Association |
| 2003 | <ul style="list-style-type: none"> ➤ RSA 487:23 became effective, establishing the Milfoil Prevention and Research Grant Program ➤ First round of Milfoil Prevention Grants awarded to three applicants |

Table 1-2
Summary of Collaborating Organizations and Their Responsibilities

| I. STATE AGENCIES | |
|--|--|
| Department of Environmental Services (DES) | <ul style="list-style-type: none"> Coordinates all aspects of the Exotic Aquatic Plant Program |
| Fish and Game Department (NHF&G) | <ul style="list-style-type: none"> Conducts reviews of special aquatic permits for herbicide application to determine potential impacts to aquatic animal habitat Provides assistance in the designation and enforcement of restricted use areas on waterbodies Coordinates and performs education/outreach activities that include information on exotic species Displays aquatic plant signs at NHF&G owned boat launch facilities Collaborates with DES on the development and production of educational materials |
| Department of Safety (NHDOS) | <ul style="list-style-type: none"> Provides assistance in the designation and enforcement of restricted use areas on waterbodies Collaborates with DES on the implementation of the Milfoil Prevention Grant Program Includes exotic plant awareness in boater safety instruction courses Ensures that all Marine Patrol officers are aware of exotic aquatic plant problems and know the protocols associated with inspecting their boats and trailers for attached plant fragments |
| Department of Agriculture, Markets and Food (NHDA) | <ul style="list-style-type: none"> Permits and oversees the application of herbicide for control of nuisance exotic plants Provides technical information on aquatic herbicides |
| Department of Resources and Economic Development (NHDRED) | <ul style="list-style-type: none"> Provides information on rare and endangered species in the event that an exotic aquatic plant may impact a threatened habitat |
| II. OTHER ORGANIZATIONS | |
| Municipalities | <ul style="list-style-type: none"> Manchester Water Works performs a number of milfoil control activities on Lake Massabesic including installation of benthic barriers and designation of restricted use areas |
| University of New Hampshire, Durham | <ul style="list-style-type: none"> Makes specimens in Hodgdon Herbarium available for verification of species Offers trained botanists' time to verify a species identification Provides outreach and education materials through the NH Lakes Lay Monitoring Program (NHLLMP) and Cooperative Extension |
| New Hampshire Lakes Association (NHLA) | <ul style="list-style-type: none"> Works closely with individual Lake Associations Coordinates with DES for the implementation and funding for the Lake Host Program Works with DES to draft appropriate legislation that pertains to exotic aquatic plants |
| Marinas | <ul style="list-style-type: none"> Provide information to boaters about exotic aquatic plants |
| Private Citizens | <ul style="list-style-type: none"> Participate in NH Weed Watchers Program by frequently monitoring the littoral zone of waterbodies during the growing season Mail or deliver suspected exotic plants to DES for identification of species |

2. EXOTIC AQUATIC PLANTS PROGRAM ACTIVITIES: 2002-2003

The primary purpose of the Exotic Aquatic Plants Program is to “prevent the introduction and further dispersal of exotic aquatic weeds and to manage or eradicate exotic aquatic weed infestations in the surface waters of the state” (RSA 487:17, II). Together, the program’s five aforementioned focus areas serve to accomplish this purpose: 1) Prevention of new infestations, 2) Monitoring for early detection of new infestations, 3) Control of new and established infestations, 4) Research towards new control methods with the goal of reducing or eliminating infested areas, and 5) Cooperation between regional and national groups. Funding for each of these activities is discussed in Section 3.

2.1 Prevention of New Infestations - Education and Outreach

Education and outreach activities are the key to prevention activities. Both regionally and nationally, efforts are being made to boost the level of information that is available to the general public about exotic aquatic plant species. The more individuals are aware of the problems associated with exotic aquatic plants, the less likelihood the plants will continue to be spread throughout the state. Education and outreach initiatives are targeted towards the users of our surface waters (boaters, personal water craft users, fishermen, and others), special interest groups (fishermen, boater groups, seaplane groups), and aquarium and water garden hobbyists.

Outreach efforts are aimed at educating the public about the characteristics and control of exotic plants, including:

1. The negative environmental and economic impacts of exotic aquatic plants
2. Exotic aquatic plant identification
3. How exotic aquatic plants spread
4. How to minimize the spread
5. Control techniques
6. New Hampshire’s Exotic Aquatic Plant laws and regulations

2.1.1 Presentations

From 2002 through 2003, the Exotic Aquatic Plant Program Coordinator and the Limnology Center Director gave 93 presentations on exotic aquatic plants. These presentations took place during annual lake association meetings, monthly Marine Trade Association meetings, legislative committee meetings, conservation commission meetings, BASS angler meetings, and lake management meetings. Presentations were also given at schools throughout the State, geared specifically to the grade and needs of the class.

In addition to presentations at lake association annual meetings and groups, the Exotic Aquatic Plant Program Coordinator attended annual lake festivals, conferences, and environmental awareness festivals throughout the state. At these events written materials were provided for distribution while the coordinator interacted on an individual basis with interested members of the public. Live specimens of exotic plants and look-alike native plants were also on display for close examination and comparison. Examples of fact sheets, pamphlets, and other

materials provided at these presentations are presented in Appendix 3. Table 2-1 presents the groups and events that received presentations from 2002 through 2003.

Table 2-1
Presentations and Seminars Given in 2002-2003

| Organization/ Event | Location | Year |
|--|------------------------|-------------|
| Bellows Falls Fishing Club | Bellows Falls | 2002 |
| Manchester Boat Show | Manchester | 2002 |
| Envirothon Training Day | Hopkinton | 2002 |
| Squam Lake Association | Holderness | 2002 |
| NH Technical Institute Environmental Science Class | Laconia | 2002 |
| NH Technical Institute Environmental Science Class | Laconia | 2002 |
| Spofford Lake Association | Spofford | 2002 |
| UNH Lake Management Class | Durham | 2002 |
| NH Fish and Game Discover Wild NH Day | Concord | 2002 |
| Lakeville, Massachusetts Association | Lakeville, MA | 2002 |
| Eaton Conservation Commission | Eaton | 2002 |
| VLAP Refresher Course | Concord | 2002 |
| Pawtuckaway Lake Association | Nottingham | 2002 |
| Connecticut River Stewards Group | Moore Visitor Center | 2002 |
| Connecticut River Stewards Group | Wilder Visitors Center | 2002 |
| Pleasant Lake Association | Deerfield | 2002 |
| Balch Lake Milfoil Task Force | Wakefield | 2002 |
| NHLA Milfoil Committee | Keene | 2002 |
| Lake Host Training | Concord | 2002 |
| Lake Kanasatka Association | Moultonborough | 2002 |
| Northwood Lake Association | Northwood | 2002 |
| NH Plant Growers Association | Concord | 2002 |
| Lake Wicwas Association | Meredith | 2002 |
| Keene Area Lakes Residents | Keene | 2002 |
| Conway Lake Association | Conway | 2002 |
| Lake Wentworth Association | Wolfeboro | 2002 |
| Lake Winnisquam Association | Tilton | 2002 |
| Holderness School Students | Tamworth | 2002 |
| Balch Lake Association | Wakefield | 2002 |
| Northwood Conservation Commission | Northwood | 2002 |
| DES Rivers Conference Attendees | Concord | 2002 |
| Marine Patrol Officers | Glendale | 2002 |
| Distant Learning Network Teachers | Weare | 2002 |
| Plymouth State University – Biology Classes | Plymouth | 2002 |
| Northeast Aquatic Nuisance Species Taskforce Panel | MA | 2002 |
| New Hampshire Landscapers | Lebanon | 2002 |
| Lake Tarleton Association | Hanover | 2002 |
| Manchester Pond Days Event | Manchester | 2002 |

| Organization/ Event | Location | Year |
|---|-----------------|-------------|
| Warren Lake Association | Warren | 2002 |
| Mountainview Lake Association | Sunapee | 2002 |
| Granite Lake Association | Stoddard | 2002 |
| Lake Monomonac Association | Rindge | 2002 |
| Webster Lake Association | Franklin | 2002 |
| Lees Pond Association | Moultonboro | 2002 |
| Squires Club Members | Sunapee | 2002 |
| Lake Winnisquam Association | Laconia | 2002 |
| Eastman Lake Association | Grantham | 2002 |
| Wakefield Conservation Commission | Wakefield | 2003 |
| Manchester Armory Sportsman Show | Manchester | 2003 |
| Granite State Boat Show Attendees | Manchester | 2003 |
| Contoocook River Improvement Association | Concord | 2003 |
| Colby-Sawyer Biology Students | New London | 2003 |
| Epsom Central School Students | Epsom | 2003 |
| Marine Patrol Auxiliary Officers | Glendale | 2003 |
| Women's Club | Moultonboro | 2003 |
| Realtor Association of NH | Durham | 2003 |
| Marine Patrol Veteran Officers | Glendale | 2003 |
| VLAP Refresher Training Workshop | Concord | 2003 |
| Naturally Newfound | Holderness | 2003 |
| Lake Host Training | Tuftonboro | 2003 |
| Pawtuckaway Lake Association | Nottingham | 2003 |
| Lake Host Training | Concord | 2003 |
| Pickerel Pond Association | Meredith | 2003 |
| Lake Host Training | Spofford | 2003 |
| Lake Congress Attendees | Wolfeboro | 2003 |
| Lake Host Training | Concord | 2003 |
| Lake Todd Association | Newbury | 2003 |
| Millen Pond Association | Washington | 2003 |
| Silver Lake Association | Harrisville | 2003 |
| Swanzey Lake Association | Swanzey | 2003 |
| Plymouth State College Summer Teachers Program Students | Plymouth | 2003 |
| Lovell Lake Association | Wakefield | 2003 |
| Newfound Lake Community Association | Holderness | 2003 |
| Weare Selectmen | Weare | 2003 |
| Winnepesaukee Yacht Club Members | Meredith | 2003 |
| Manchester Boat Show Attendees | Manchester | 2003 |
| Laconia Boat Show Attendees | Laconia | 2003 |
| Fly Fishing Show Attendees | Pelham | 2003 |
| Contoocook River Association | Contoocook | 2003 |
| Lees Pond Association | Moultonborough | 2003 |
| NH Realtors Association | Meredith | 2003 |

| Organization/ Event | Location | Year |
|---|-----------------|-------------|
| Poole Pond Association | Rindge | 2003 |
| NH Lakes Congress | Wolfeboro | 2003 |
| Laurel Lake Association | Fitzwilliam | 2003 |
| Rock Pond Association | Windham | 2003 |
| Gilford Rotary Club | Gilford | 2003 |
| Beaver Lake Association | Derry | 2003 |
| Paugus Bay Association | Laconia | 2003 |
| Halfmoon Pond Association | Barnstead | 2003 |
| Lions Club | Concord | 2003 |
| Lake Winnisquam Association | Belmont | 2003 |
| Plymouth State Freshwater Biology Symposium | Plymouth | 2003 |

2.1.2 Dissemination of Exotic Aquatic Plant Information through the Media

The Exotic Aquatic Plant Program was the focus of two live radio broadcasts in 2002 and 2003, including one on NH Public Radio, and one through the State Employees Union on top environmental concerns.

Another mechanism of media publicity was through several interviews and local coverage by Channel 9 News. At least four times during the summers of 2002 and 2003, DES worked with Channel 9 to broadcast information about control practices, preventative measures, and proactive approaches to exotic aquatic plant control.

The Exotic Aquatic Plant Program maintains a regularly updated website at www.des.state.nh.us/wmb/exoticspecies/. The website provides links to exotic plant identification information, weed watching information, exotic aquatic plant distribution maps, and copies of fact sheets and exotic aquatic plants legislation and regulations. The site is frequently updated with new information on lake and river infestations, and facts and figures on exotic aquatic plants.

To inform boaters and other users of our surface waters, DES, the New Hampshire Fish and Game Department, and the New Hampshire Department of Resources and Economic Development have collaborated to have signs posted at each of the state-owned public access sites. These signs warn boaters about exotic plant infestations, and where to look on their recreational equipment for tag-along plant fragments. Examples of each type of sign are included in Appendix 4.

DES and the NH Fish and Game Department have also collaborated on the development of an educational brochure entitled “Don’t Leave them Stranded,” published in June 2003, for distribution to schools and pet stores to prevent the spread of exotic aquatic plants. The brochure details ecologically sound and humane options for disposing of unwanted aquarium plants, as well as alternatives such as donations of live organisms to schools and other venues. The goal of the brochure is to prevent the dumping of live aquarium contents into surface waters.

For multimedia productions, DES and New Hampshire Lakes Association collaborated on two videos produced in July 2003. The purpose of the videos is to educate the general public about exotic aquatic plants. "New Hampshire Lakes Under Attack" is an informational video about plants of concern, ecological and economic impacts of exotic aquatic species, and the prevention and management of exotic plant infestations. The second video, entitled "Lake Hosts: Helping Protect New Hampshire's Lakes" is geared to individuals involved in the Lake Host Program, and serves as a training tool.

DES also worked with Maine and New Hampshire Public Television to produce a "Quest" episode entitled "BioInvasions" during the summer and fall of 2003. The video was aired in December 2003 on New Hampshire Public Television. The focus of the program was on invasive species in general, including their impacts on ecology and economics of our natural resources. The episode is re-broadcast frequently on public television.

2.1.3 Milfoil Prevention Grants

To further promote milfoil prevention activities and stimulate cooperative ventures with various interest groups, DES has implemented a milfoil and other exotic aquatic plant prevention grant program. Funding for this new program was established through legislation, and as of January 1, 2003, \$3 from each boat registration fee is allocated towards this innovative grant program.

The intent of the milfoil prevention grants is to garner public support and participation in milfoil prevention activities, including such activities as education and outreach initiatives, staffing public access sites to conduct inspections of aquatic recreational gear for attached aquatic plant fragments, and other similar projects.

A Request for Proposals was issued in February 2003 for the first round of Prevention Grants. The Department received four proposals, which were reviewed by a committee comprised of a designee of the Commissioner of the Department of Environmental Services, a designee of the Commissioner of the Department of Safety, and a member of the New Hampshire Lakes Management Advisory Committee. The proposals were reviewed for eligibility and ranked based on the review criteria included in the 2003 Management Plan for Milfoil Prevention Grants (Appendix 5). Three of the four projects were funded (one was not eligible as it did not fit the criteria for a prevention project). Table 2-2 summarizes the three funded projects and their respective funding levels for 2003:

Table 2-2
Summary of 2003 Prevention Grant Funded Projects

| Grantee | Project Summary | Grant Amount |
|---|---|--------------|
| Androscoggin River Watershed Council (ARWC) | <p>The purpose of the Androscoggin River Watershed Council project is to prevent the introduction of exotic aquatic plants into the Androscoggin River Watershed. To date, the Androscoggin River, Lakes Umbagog and Jericho, and Akers Pond are still free from infestations of exotic plants.</p> <p>The ARWC coordinated public education activities, developed courtesy boat inspection stations at 12 launch sites throughout the reach of the Androscoggin River and nearby lakes and ponds, and publicized the issue of exotic plants in local newspapers and newsletters.</p> <p>The ARWC also conducted Weed Watching activities at Lake Umbagog and Akers Pond, as well as along several stretches of the Androscoggin River.</p> | \$7,200.00 |
| New Hampshire Lakes Association (NHLA) | <p>The purpose of the NHLA project was to prevent the introduction of exotic aquatic plants into lakes and ponds in New Hampshire by administering a Lake Host Program on public access sites throughout the state. 59 public access sites on 45 lakes and ponds across New Hampshire were staffed in 2003 through this grant, and Lake Hosts inspected over 25,000 boats and trailers. Appendix 2 lists all lakes that participated in the program in 2003.</p> <p>Lake Hosts conducted inspections of boats, trailers and other recreational gear as they entered and departed public waters. They also distributed pamphlets and other educational materials to recreationists and recorded data on the numbers and types of recreational vessels visiting these access sites, as well as data on plants that may have been attached to recreational gear.</p> <p>The NHLA coordinated all aspects of implementation for this program, including the hiring of lake hosts, payroll, and coordinating training of all participants.</p> <p><i>Lake Hosts discovered viable exotic plant material on seven boats and trailers in 2003, and removed the plant fragments before boats were launched into an uninfested waterbody. Therefore, this program is recognized for 'saving' seven previously uninfested waterbodies from exotic plants.</i></p> | \$165,000.00 |
| Department of Safety, Division of Safety Services (NHDOS) | <p>The purpose of the Department of Safety, Division of Safety Services project was to update and expand the New Hampshire Boater's Guide to include more information on exotic aquatic plants.</p> <p>Four additional pages of information on exotic plants were developed by the Department of Environmental Services for inclusion in the Department of Safety's Boater's Guide, replacing the single page in the previous edition. These Guides are distributed to over 100,000 boaters each year.</p> | \$15,015.00 |

2.2 Early Detection - Monitoring and Identification

DES takes an active role in monitoring both the natural environment, as well as the retail industry, to prevent new introductions of exotic aquatic plants into New Hampshire's surface waters. Following is a summary of the monitoring activities conducted in 2002 and 2003.

2.2.1 Field Monitoring

Between 2002 and 2003, DES biologists conducted aquatic macrophyte mapping as an element of the scheduled lake assessments at 80 lakes. Any new or existing infestations of exotic aquatic plants were documented and mapped, and control actions were recommended based on the status of the infestation. Table 2-3 summarizes this information for 2002 and 2003.

Table 2-3
New Exotic Aquatic Plant Infestations Identified by Lake Assessment
from 2002 through 2003

| Waterbody | Town | Exotic Aquatic plants | Year | Recommended Control Action |
|----------------------------|-------------|-----------------------|------|-----------------------------|
| Barnstead Parade Dam Pond | Barnstead | Variable milfoil | 2002 | No requests for management* |
| Haunted Lake (Scobie Pond) | Francestown | Variable milfoil | 2003 | Herbicide treatment in 2004 |

*Several areas upstream of this site are infested and will need to be addressed before this downstream site is managed.

2.2.2 Pet and Plant Nursery Store Monitoring

In 1998, legislation went into effect banning certain activities associated with exotic aquatic plants in New Hampshire. Specifically, RSA 487:16-a states, "*No exotic aquatic weeds shall be offered for sale, distributed, sold, imported, purchased, propagated, transported, or introduced in the state of New Hampshire.*" To implement this program, the Department of Environmental Services adopted rules to prohibit the following exotic aquatic plants in the state:

Yellow Floating Heart (*Nymphoides peltata*)
Frogbit (*Hydrocharis morsus-ranae*)
Water Chestnut (*Trapa natans*)
Variable Milfoil (*Myriophyllum heterophyllum*)
Eurasian Milfoil (*Myriophyllum spicatum*)
Parrot Feather (*Myriophyllum aquaticum*)
Curly-Leaf Pondweed (*Potamogeton crispus*)
Brazilian Elodea or Anacharis (*Egeria densa*)
Hydrilla or Anacharis (*Hydrilla verticillata*)
Common Reed (*Phragmites australis*)
Flowering Rush (*Butomus umbellatus*)
Purple Loosestrife (*Lythrum salicaria* & cultivars) Fanwort (*Cabomba caroliniana*)
European Naiad (*Najas minor*)

During the 2002 and 2003 summer seasons, the Exotic Aquatic Plant Program staff inspected approximately 121 pet and plant stores. Only pet stores were inspected for exotics during the summer of 2002, but both plant and pet stores were monitored during 2003.

A thorough plant inspection at each store was followed by the distribution of educational materials and references to state laws on exotic aquatic plants to store owners. During the summer of 2003, stores were provided with pamphlets to distribute to customers when they purchased aquatic plants.

All stores found to be offering prohibited plants for sale were issued Letters of Deficiency (LODs). Eleven stores were issued LODs in 2002, ten of which resulted from normal inspections, while the other was the result of a complaint investigation. Four stores offered the sale of Brazilian elodea (*Egeria densa*), three offered the sale of Parrot Feather (*Myriophyllum aquaticum*), one offered the sale of Frogbit (*Hydrocharis morsus-ranae*), three sold Fanwort (*Cabomba caroliniana*), and two offered the sale of Variable Milfoil (*Myriophyllum heterophyllum*).

Three stores were issued LODs in 2003. Two LODs were the result of complaints to DES from concerned citizens, while one LOD was the result of a routine inspection. All three were for the sale of Brazilian elodea (*Egeria densa*). Table 2-4 lists the stores that were issued LODs during 2002 and 2003. The pet stores will be re-examined in 2004 to determine continued compliance with the legislation and regulations.

Table 2-4
Retail Store Exotic Plants Violations

| Date | Nursery | Location | Exotic Plant | Action |
|-------------|-------------------------------|-----------------|-------------------------|---------------|
| 6/27/02 | Laconia Pet Center | Laconia | Parrot Feather | LOD |
| 7/3/02 | Plymouth Pet & Aquarium | Plymouth | Fanwort | LOD |
| 7/3/02 | Animal House II | N. Conway | Fanwort | LOD |
| 7/3/02 | Little Critters Pet Center | Littleton | Variable Milfoil | LOD |
| 7/10/02 | Agway | Peterborough | Frogbit, Parrot Feather | LOD |
| 7/25/02 | Empire Pet | Antrim | Fanwort | LOD |
| 7/25/02 | Lebanon Pet & Aquarium | Lebanon | Anacharis, Parrot F. | LOD |
| 7/25/02 | Steve's Pet Shoppe | Lebanon | Variable Milfoil | LOD |
| 8/5/02 | Osborne's Agway | Hooksett | Anacharis | LOD |
| 8/16/02 | Pet Quarters | Newington | Anacharis | LOD |
| 8/16/02 | Pet City | Seabrook | Anacharis | LOD |
| 5/7/03 | House By the Side of the Road | Wilton | Anacharis | LOD |
| 5/22/03 | Osborne's Agway | Concord | Anacharis | LOD |
| 7/31/03 | Lake St. Garden Center | Salem | Anacharis | LOD |

2.2.3 Volunteer Weed Watcher Program

The goal of this program is to promote a volunteer, grass-roots effort to monitor lakes, ponds, and rivers for the early detection of exotic aquatic plant infestations. Because eradication of established exotic plant infestations is rarely possible, early detection is of utmost importance. Trained Weed Watchers monitor waterbodies for new infestations frequently during the summer season, and report suspected new infestations to DES. This allows DES biologists to respond rapidly to new infestations, in the same season as their discovery.

Weed Watcher volunteers are trained by DES biologists to identify both exotic aquatic plants and native plants that are common in their waterbody. Typically, training involves providing volunteers with photographic keys to native and exotic plants and accompanying them in the field to instruct them how to identify plants within their chosen waterbody. If no exotics are present, the Coordinator will provide specimens of exotic aquatic plants for the volunteers to use as learning tools. Volunteers are also supplied with vegetation maps that were prepared by the DES Lake Assessment Program for their waterbody, a Weed Watcher Kit containing fact sheets on the exotic plants, instruction on how to Weed Watch, maps of infestations in the state, and laminated plant identification guides. Instructions on how to immediately report any suspected new infestations are also included in the kit, as well as how to collect and send samples of suspect plants to DES for positive identification.

Weed Watcher volunteers survey their waterbody once each month from May through September for any new plant growth, patrolling the shallow zones of their lakes and mapping the vegetation they observe. The volunteers provide plant survey information to DES for entry into a database, and they collect specimens of unfamiliar plants and deliver them to DES for positive identification. There are now over 300 trained Weed Watchers monitoring over 100 waterbodies for early detection of exotics. This does not include a number of volunteers from the Volunteer Lake Assessment Program that participate on an "unofficial" basis (some have not been trained by the Coordinator so they are not considered official Weed Watchers).

Fortunately, of the 206 unfamiliar plants that were delivered to DES during the 2002 and 2003 seasons, 201 were native plants, and only five new infestations of exotic plants were discovered.

Table 2-5 lists the exotic aquatic plants that were documented during surveys. The early detection system employed by Volunteer Weed Watchers led to control practices that checked the spread of exotic plants in these waterbodies.

Table 2-5
New Exotic Aquatic Plant Infestations Identified by Weed Watchers
from 2002 through 2003

| Waterbody | Town | Exotic Aquatic plants | Year | Resulting Control Practice |
|-------------------------------|-------------|------------------------------|-------------|--|
| Balch Pond | Wakefield | Variable Milfoil | 2002* | Diquat treatment in 2003 |
| Melendy Pond | Brookline | Variable Milfoil | 2002 | Herbicide treatment scheduled for 2004 |
| Brindle Pond | Barnstead | Variable Milfoil | 2002 | No treatment* |
| Jones Pond Dam | New Durham | Variable Milfoil | 2003** | 2,4-D treatment in 2003 |
| Scobie Pond (Haunted Lake) | Franeestown | Variable Milfoil | 2003 | Diquat treatment scheduled for 2004 |

* No one lives on this pond, and a treatment was not requested.

**These infestations were present prior to this year, but the plants did not flower until the year specified in the table above. Without a flower structure accurate identification is not possible.

2.3 Control

The Exotic Aquatic Plant Program relies on a number of methods to control exotic plant infestations, including physical control, chemical control, biological control, and habitat manipulation. Table 2-6 outlines each control method, including information on target plant specificity, advantages, disadvantages, and the approximate cost of each method (cost analysis provided by Aquatic Control Technologies, Inc., 1997). Criteria for the selection of control techniques are presented in Appendix 6.

During 2002-2003, 47 herbicide treatments, 13 benthic barriers, 14 hand pulls, and two harvesting activities were conducted. Table 2-7 provides details on specific projects conducted during 2002-2003.

Table 2-6
DES Exotic Aquatic Plants Program: Plant Control Techniques (cost estimates from 1997)

| Action | Effectiveness | Specificity to Target | Advantages | Disadvantages | Cost* |
|---|---|---|--|---|---|
| Hand Pulling (Physical) | Removes a few individual plants at a time | High | Good for localized areas/ few plants Plants physically removed from waterbody | Labor intensive Good for small infestations only. Not practical when plant growth is dense | Labor Costs vary depending upon contractor costs or staff time add / acre estimate |
| Mechanical Harvesting (Physical) | Removes large amounts of vegetation at a time | Not specific | Rapidly removes vegetation from area Removes plants physically from waterbody | Residual plant fragments could cause regrowth Removes beneficial native vegetation along with the exotics. Could increase turbidity, ultimately affecting other aquatic life Does not remove roots | Ranges widely depending on plant density, location, disposal, etc. \$350-\$1500 per acre |
| Hydro-raking (Physical) | Removes large amounts of vegetation at a time | Not specific | Rapidly removes vegetation Removes roots to prevent rapid regrowth. Removes plants physically from waterbody | Residual plant fragments could cause regrowth Could increase turbidity, ultimately affecting other aquatic life Removes beneficial native vegetation along with the exotics. | Ranges widely depending on plant density, location, and disposal. \$350-\$2500 per acre |
| Permeable Benthic Barrier (Physical) | Used for very small infestations | Specific to area where barrier is located | Compresses plants to sediments and prevents likelihood of fragmentation by wind, | Labor intensive Requires frequent barrier cleaning or re-staking Does not physically remove | \$0.60-\$1.22 per square foot or(\$25,000- |

| Action | Effectiveness | Specificity to Target | Advantages | Disadvantages | Cost* |
|-----------------------------------|--|--|---|---|---|
| Permeable Benthic Barrier (cont.) | | Impacts all plants under barrier | wave, or anthropogenic means | plants from waterbody May cause sediment/water oxygen depletion May impact non-target species such as fish | \$50,000 per acre) |
| Herbicides (Chemical) | Herbicides which are taken up by root systems (systemic herbicides) more effective than contact herbicides | Most chemicals have target plants for which they are most effective Varying application rates can increase target specificity | Chemical can eliminate exotic plant infestation if done at correct time, and if correct concentration is used Relatively rapid effect Longer time span of control (xx years?) than other types of control techniques (xx months?) not sure this is true | Chemicals added to waterbody May impact non-target species Could be environmentally damaging by impacting non-target species, if not applied per label restrictions | Varies with chemical and size of treatment area ~\$350-450/acre for 2,4-D ~\$250-350/acre for Diquat Plan for approximately \$2000 of additional fees for permitting and sample/analysis |
| Drawdown (Habitat Manipulation) | Somewhat effective if repeated frequently I thought data show its ineffective?? | Not specific | Could control density of vegetation due to plant die off from desiccation or freezing | Impacts non-target plants Impacts fish, amphibians, insects, and other aquatic organisms | Low cost if dam or other means of drawing down water is available |

| Action | Effectiveness | Specificity to Target | Advantages | Disadvantages | Cost* |
|--|---|-----------------------|---|---|---|
| Drawdown (cont.) | More effective if drawdown maintained for long time period | | Can be cost effective | Drastically changes entire waterbody ecology | |
| Dredging (Habitat Manipulation) | Effective in removing plants from localized area where dredge takes place | Not specific | Completely removes all plant material Removes nutrient laden sediments Removes seed bank | Drastically changes entire waterbody ecology Impacts non-target plants and animals Could cause excessive turbidity Must wait for waterbody fill after dredging | Previously used and successful in one lake in New Hampshire (Milville Lake) \$16,000-32,000 per acre |
| Insects, bacteria, or viruses that infect and kill or weaken target plants (Biological) | List specific organisms and targets. Effective against target plants | Specific | Insects, bacteria, or viruses used in this method are typically specific to target plant. Their life cycles revolve around particular plant species Does not affect other non-target plants | May cause decline in oxygen as plant material decays Many biological controls are themselves exotic Still experimental | Cost of insects Monitoring cost high |

*Costs are averages determined from data obtained from “Draft Generic Environmental Impact Report” for Massachusetts, and from Aquatic Control Technology, Inc. Fact Sheet.

**Table 2-7
Summary of 2002 through 2003 Control Projects**

| Waterbody/Town | Benthic Barriers | Hand Pulls | Harvesting | RUAs* | Chemical |
|--------------------------------------|-------------------------|-------------------|-------------------|--------------|-----------------|
| 2002 | | | | | |
| Belleau Lake, Wakefield | | | | | X |
| Contoocook River, Jaffrey | | | | | X |
| Winni-Round & Fish Coves, Meredith | | | | | X |
| Winni-Moulton Bay, Moultonborough | | | | | X |
| Contoocook Lake, Rindge | | | | | X |
| Winni-Lake Shore Park, Gilford | | | | | X |
| Winnisquam-Jays Marina, Tilton | | | | | X |
| Winni-Minge CV-Isl Marina, Alton | | | | | X |
| Winni-Gilford Yacht Club, Gilford | | | | | X |
| Winni-Black Cat Island | | | | | X |
| Suncook Lakes, Barnstead | X | X | | X | X |
| Captain Pond, Salem | | | | | X |
| Winni-Rand Cove, Alton | | | | | X |
| Danforth Pond, Middle, Freedom | X | X | | | X |
| Turtle Pond, Concord | | | | | X |
| Gorham Pond, Dunbarton | | | | | X |
| Locke Lake, Barnstead | | | | | X |
| Winni-Hemlock Harbor, Moultonborough | | | | | X |
| Monomonac Lake, Rindge | | | | | X |
| Robinson Pond, Hudson | | | | | X |
| Sunapee Lake, Sunapee | X | | | | |
| Massasecum Lake, Bradford | X | X | X | X | |
| Winnisquam- Mallards Land., Belmont | | | | | X |
| Cobbetts Pond, Windham | | | | | X |

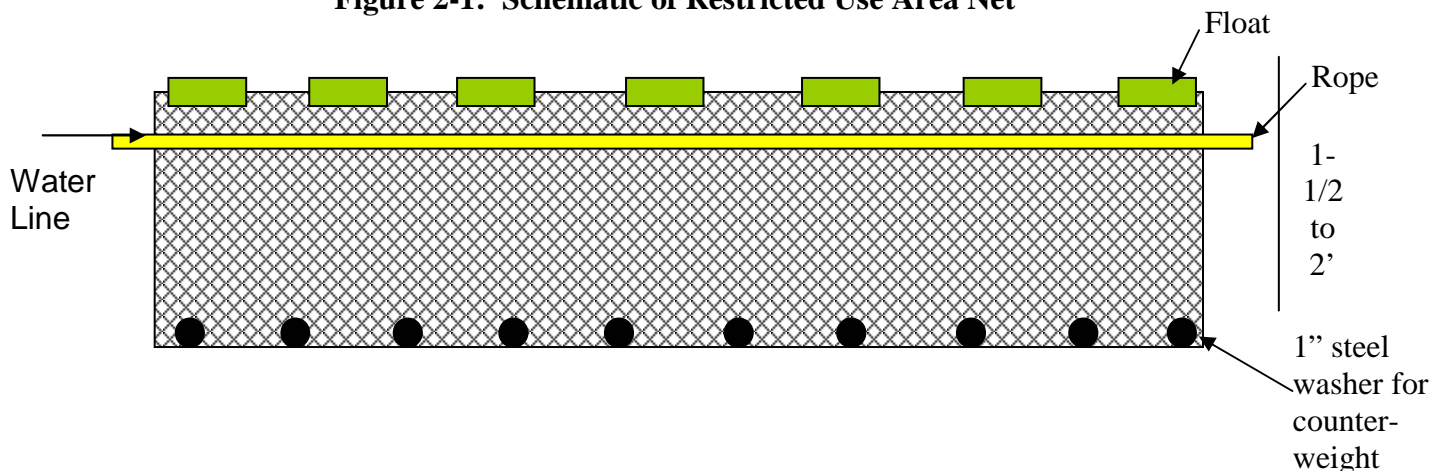
| Waterbody/Town | Benthic Barriers | Hand Pulls | Harvesting | RUAs* | Chemical |
|---|-------------------------|-------------------|-------------------|--------------|-----------------|
| Northwood Lake, Northwood | | X | | | X |
| Winnisquam-Sunray Shores, Belmont | | | | | X |
| Winni-Hemlock Cove, Moultonborough | | | | | X |
| Paugus Bay-Christmas Isl, Laconia | | | | | X |
| Winnisquam-Split Rock Sanctuary, Meredith | | | | | X |
| Squam Lake, Holderness | X | X | | | |
| Lake Massabesic, Auburn | X | X | | X | |
| 2002 Totals: | 6 | 6 | 1 | 2 | 27 |
| 2003 | | | | | |
| Nutts Pond, Manchester | X | X | | | X |
| Jones Pond, New Durham | | | | | X |
| Potanipo Pond, Brookline | | | | | X |
| Balch Pond, Wakefield | | X | | X | X |
| Winni-Hemlock Harbor, Moultonborough | | | | | X |
| Cobbetts Pond, Windham | | | | | X |
| Wentworth Lake, Wentworth | X | X | | | X |
| Lees Pond, Moultonborough | | | | | X |
| Massasecum Lake, Bradford | X | X | X | X | |
| Winni-DOS Marine Patrol, Gilford | | | | | X |
| Winni-Krainwood Shores, Moultonborough | | | | | X |
| Squam Lakes Channel, Holderness | X | X | | | X |
| Squam Bridge Landing Marina, Ashland | X | X | | | X |
| Squam Little Kimball Marina, Holderness | X | X | | | X |
| Turkey Ponds & Channel, Concord | | | | | X |

| Waterbody/Town | Benthic Barriers | Hand Pulls | Harvesting | RUAs* | Chemical |
|---|------------------|------------|------------|----------|-----------|
| Belleau Lake, Wakefield | | | | | X |
| Winni-Gilm Pt. Greens Bas, Moultonborough | | | | | X |
| Pillsbury Lake, Webster | | | | | X |
| Winni-Mered. Yacht Club, Meredith | | | | | X |
| Lake Monomonac, Rindge | | | | | X |
| Hopkinton Lake, Hopkinton | | | | | X |
| Lake Massabesic, Auburn | X | X | | X | |
| 2003 Totals: | 7 | 8 | 1 | 3 | 20 |

2.3.1 Restricted Use Areas

Restricted Use Areas (RUAs) are a regular control option for lakes with small, contained infestations of exotic plants, limited to small patches or embayments. This is often the case in waterbodies with newly-discovered infestations. RUAs restrict access to all recreational activities in a delineated area to minimize plant fragmentation and thereby reduce the spread of milfoil. As an additional method of protection from fragment migration, RUAs are encircled with a shallow net that is suspended vertically in the water column. The net is approximately 1.5-2.0 feet in height. The top of the net is set to extend four inches above the surface of the water, while the remainder is positioned below the surface of the water (see Figure 2-1 below). This configuration prevents the movement of fragments from infested areas to uninfested areas.

Figure 2-1: Schematic of Restricted Use Area Net



To install an RUA, DES must notify the Department of Fish and Game, and the Department of Safety to garner their support in the designation of RUAs on waterbodies.

Example #1 - Lake Massasecum, Bradford

An RUA has been in place on Lake Massasecum, Bradford since the summer of 1999. An infestation of variable milfoil covering approximately 10 acres of the northern cove has been successfully contained since the RUA has been in place. The netting continuously traps floating fragments of the plant. Volunteers regularly clean milfoil fragments from the net.

Example #2 - Lake Massabesic, Manchester

Lake Massabesic is Manchester's water supply, and also receives high levels of transient boat traffic. Manchester Water Works has maintained four RUAs on the lake since 1996; two near Deer Neck Bridge (Route 28), and two near Claire's Landing in Auburn. As Lake Massabesic is a public water supply, herbicides are not an option in the control of exotic aquatic plants. The RUAs have been effective in keeping boaters out of isolated patches of milfoil in the lake, and the patches have not spread.

Table 2-8 lists the locations of active Restricted Use Areas in 2002 and 2003.

Table 2-8
List of Restricted Use Areas in place in 2002 and 2003

| Waterbody | Town | Installed | Removed |
|------------------|--------------|------------------|--|
| Lake Massabesic | Auburn | 1996 | Still in place |
| Lake Massasecum | Bradford | 1998 | Still in place |
| Squam Lake | Holderness | 2001 | Removed for 2003 season, reinstalled in 2004 |
| Lake Sunapee | Georges Mill | 2001 | 2002 |
| Balch Lake* | Wakefield | 2002 | Installed annually |

*This RUA is more of a containment device for fragments. Access is not restricted.

2.3.2 Hand-pulling

When infestations of exotic aquatic plants begin as single scattered stems or small patches, DES biologists SCUBA dive to hand-pull the plants. This control practice has proven successful in many waterbodies.

For a new infestation, hand-pulling activities are typically conducted several times during the first season, with follow-up inspections for the next 1-2 years or until no re-growth is observed.

Example #1- Lake Sunapee at Georges Mill

In 2002 and 2003, Lake Sunapee continues to be free from exotic plants in Georges Mill. An occasional stem of variable milfoil breaches the benthic barrier, but it is quickly hand-pulled by DES staff or staff from the Lake Sunapee Protective Association.

Example #2- Dublin Lake, Dublin

In 2002 and 2003, DES biologists visited the area of infestation in Dublin Lake, Dublin. (A new exotic plant infestation was found on this lake in 2001, and hand-pulling, combined with

benthic barriers, were the control strategies used in that first year). No hand-pulling was needed in 2002 or 2003 as milfoil was successfully managed the first year with hand-pulling.

2.3.3 Benthic Barriers

When a small infestation of exotic aquatic plants occurs in clusters of growth, as opposed to scattered stems, a permeable fiberglass screen can be placed over the area of infested lake sediments. The permeable fabric screening allows for gas release from the sediments while effectively blocking sunlight and compressing the plants into the sediment, inhibiting photosynthesis and eventually killing the plant. Occasionally, in some lakes, gas release from the sediments or boating activity causes uplifting of the screening. Benthic barriers can effectively control small infestations of less than approximately 1000 square feet.

During 2002-2003, benthic barriers were placed in Kimball Marina in Squam Lake. Due to the large size of the matting (roughly 14' X 40 feet), excessive gas accumulation under the barrier caused the fabric to rise from the sediments. This led to navigation hazards for boaters, so the barrier was removed. The Squam Lakes Association selected areas of the marina for small-scale matting.

2.3.4 Dredging

Dredging is costly, and milfoil and other exotic plants tend to quickly colonize disturbed areas such as dredged sites. If a dredge does not completely remove all plant fragments from the lake, the area will be quickly re-colonized, thereby negating the effect of the dredge. This was seen at Mallards Landing on Lake Winnisquam, and at Jay's Marina on Lake Winnisquam which was quickly colonized by milfoil after dredging for boat navigation in the 1980s.

Dredging has been used once for exotic aquatic plant control in New Hampshire. Milville Lake in Salem was dredged in the mid 1980s to remove an infestation of exotic fanwort. The dredge was successful, and to date fanwort has not re-infested the lake.

Example #1- Lake Winnisquam at Mallards Landing

A dredge project was conducted at Mallards Landing on Lake Winnisquam in 2002. The dredge was intended to deepen the shallow marina and to remove milfoil. Though hand-pulling activities were required by the DES Wetlands Bureau as a condition of the dredge permit, milfoil has returned in this location.

2.3.5 Targeted Application of Herbicides

Herbicide applications are conducted each year by DES, lake associations and municipalities. Herbicides applications are generally conducted upon the written request of lake residents or municipalities. If the infestation is new, DES will pay for 100% of the treatment cost for the first treatment. After that, DES will match up to 50% of the cost of treatment. Herbicides can result in 1 to 3 years of exotic aquatic plant control. All herbicide applications are performed under permits issued by the New Hampshire Department of Agriculture, Division of Markets and Food, Bureau of Pesticide Control.

Two herbicides have been used in New Hampshire for the control of variable milfoil. Diquat (trade name Reward), the most often-used herbicide, is a contact herbicide that can provide one to two seasons of control for milfoil. Because this herbicide does not target the root systems, the plants eventually re-grow from established roots.

The second herbicide, 2,4-D (trade name Navigate), is a systemic herbicide. It is absorbed into the sediments and taken up through the root system, killing both the roots and the plant biomass above the sediments. Label restrictions for aquatic application currently limit its use in New Hampshire to waterbodies with no water intakes, and with no wells adjacent to the shoreline.

A new herbicide, Fluridone (trade name Sonar) was used in New Hampshire during the 2002 season to treat fanwort infestations in Robinson Pond in Hudson. This herbicide was added to the pond in June 2002 and the concentration was maintained through the summer to target the plant. Follow-up inspections showed that the herbicide successfully controlled both fanwort and milfoil growths. Unfortunately some small populations of the plants did survive the treatment, so regrowth is expected.

2.3.6 Extended Drawdown

Drawdowns have been used in the past for plant control. In theory, the drying of the plants in the summer, or the freezing of the plants in the winter, will eliminate or limit plant growth. However, milfoil often forms a more succulent terrestrial form during drawdown conditions and the succulent form of the plant can remain viable for long periods of time without submergence, making the practice ineffective.

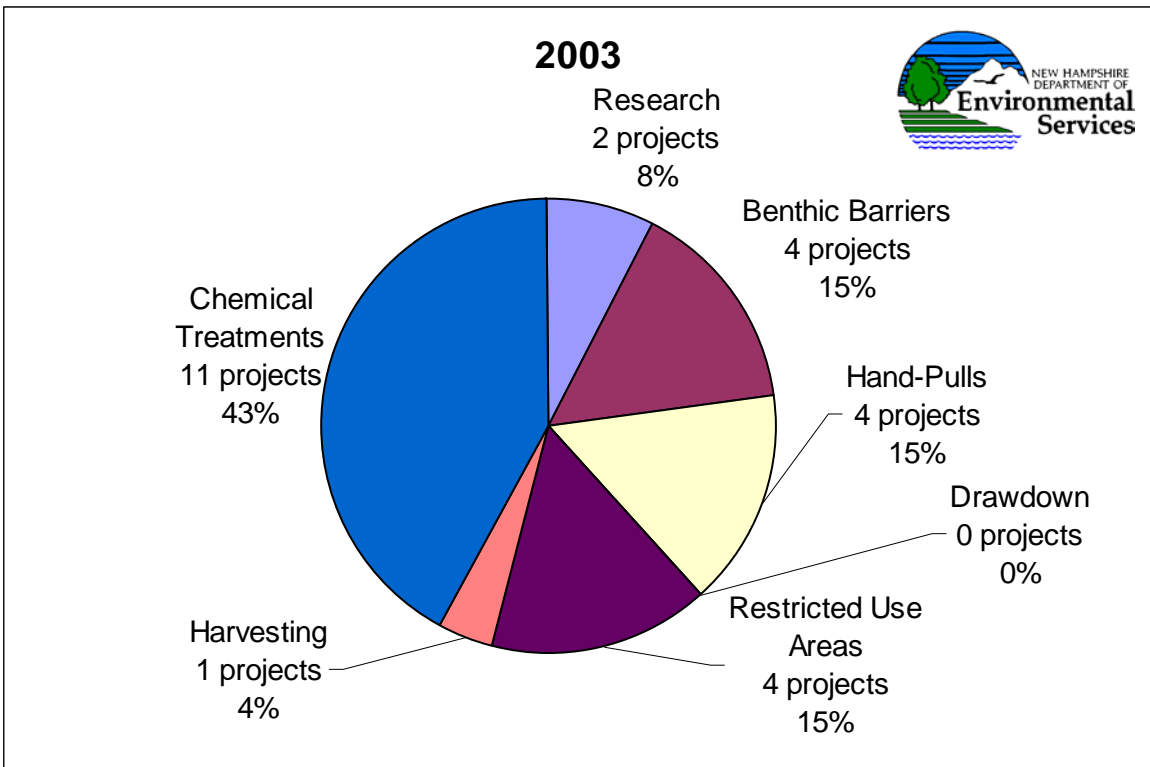
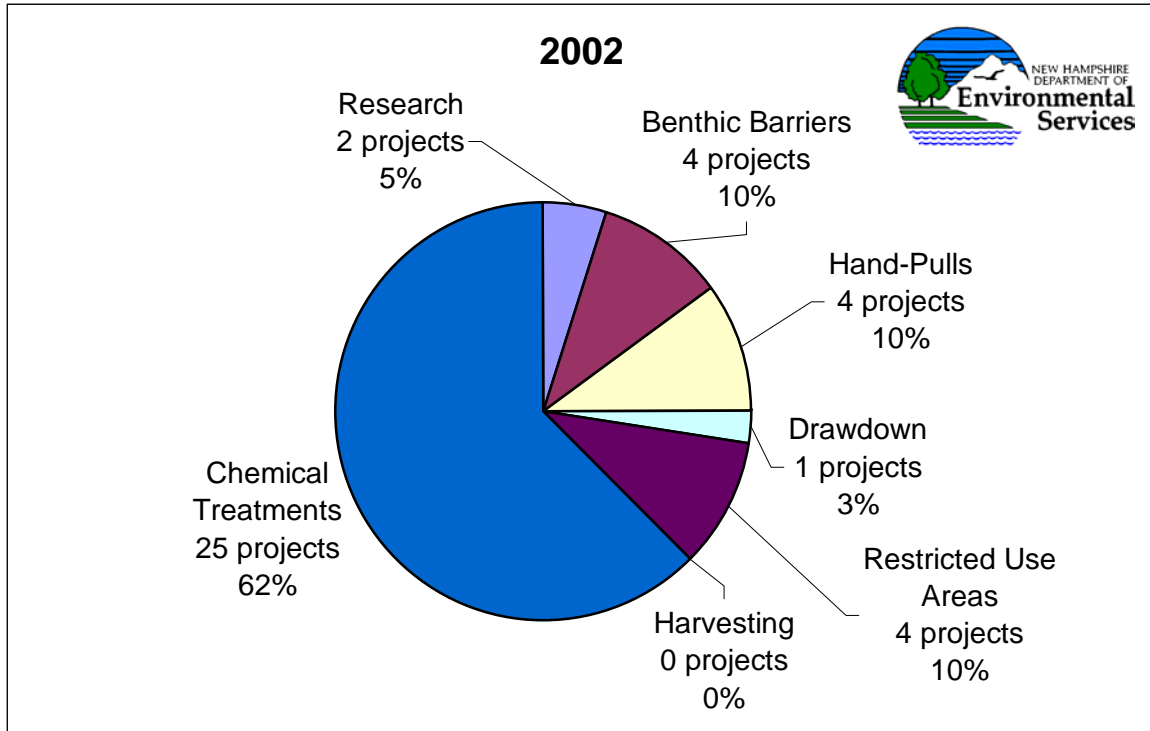
During the history of the Exotic Aquatic Plant Program, controlled drawdown has been successful at only one lake, Mountain Pond in Brookfield. In the 1980s, the pond was heavily infested with Eurasian milfoil. In 1991 the outlet structure was demolished and the pond was left empty for three full years to expose the plant to the elements. After three years, the outlet structure was rebuilt to raise the water level. Annual surveys in the late 1990s showed no regrowth of the Eurasian milfoil, but a regrowth of native vegetation. However, during a follow-up survey in 2003, 5-6 foot tall stems of Eurasian milfoil were found growing in the pond. At this point it is unknown if this is a new infestation or a re-growth; however, this was most likely a re-growth of the plant as this pond is a relatively remote waterbody.

Figure 2-2 shows a breakdown of the projects into numbers and percent of resource allocation to each control practice.

2.4 Research

Research activities are a key element in the Exotic Aquatic Plant Program. As variable milfoil, the most common exotic aquatic plant in New Hampshire, is not a common nuisance species in most of the rest of the United States, little research has been conducted on the plant's biology, ecological relationships, and potential control strategies. By working with local colleges and universities, as well as field-testing various hypotheses on New Hampshire waterbodies, the Program can address the needs for finding viable control solutions to apply to existing infestations of this plant, and developing more effective mechanisms of prevention.

Figure 2-2
Exotic Aquatic Plant Control Activities (2002 and 2003)



Source: Data from DES Exotic Aquatic Plants Program, 2002-2003

During 2002 and 2003, DES partnered with Dartmouth College to conduct research on the DNA gene sequencing for all milfoil species found in New Hampshire. The goals of this research were to assess the genetics of milfoil species that are collected from various lakes and ponds to determine the frequency of error in the identification of the plants from physiological traits, and to determine if the milfoil species are hybridizing in New Hampshire lakes and ponds.

This study showed that the milfoil species in New Hampshire do not show trends for hybridizing between species, though other research from New England does show that hybrids of variable milfoil are present in Maine, Connecticut, and Rhode Island (information on documented hybrids is obtained from personal communications with Michael Moody, a doctoral candidate at the University of Connecticut).

With regards to accuracy in identification, the species within the family Haloragaceae are difficult, if not impossible, to identify when fruit or flowers are not present. DES wanted to know the error rate in keying plants to the species level, to determine whether this method provided accurate identifications of milfoil species. Genetics research showed that in roughly 86% percent of the evaluations, identifications were correct. In 14% of the cases, identifications without fruit or flower yielded erroneous results. Fortunately, the bulk of the error in identification stems from confusion between native species, rather than in successful differentiation of native versus exotic growth.

DES will continue to work with Dartmouth College researchers to formulate a simplified method that can eventually be used by DES as a 'cookbook method' for regularly identifying unknown species of milfoil, thereby increasing the speed and accuracy of plant identifications within this macrophyte family.

As discussed earlier in this report, new funding established on January 1, 2003, resulted in the development of a fund to support milfoil and other exotic aquatic plant research projects. Projects to receive this funding should be aimed at controlling milfoil or other exotic aquatic plant species in New Hampshire. No grants were issued in 2003 as revenues were not sufficient to support a research project at that time, but it is expected that funding will be available in 2004 for the first round of research grants to be awarded. With the awarding of research grant funds, DES hopes to expand research efforts in the next few years.

2.5 Regional Cooperation

A primary goal of regional cooperation is to standardize the list of prohibited exotic aquatic plants among New England states, and to establish common legislation, regulations, and rapid response protocols with neighboring states. Until 2003, only New Hampshire, Vermont, and Maine had passed legislation prohibiting sale or transport of certain listed exotic plants. Other states are becoming interested in creating programs and legislation, and in fact, Connecticut passed new legislation in 2003 that prohibited certain activities associated with exotic aquatic plants. Prohibition of exotic species sale and transport is much more effective on a regional basis than when conducted state-by-state. If a standardized list of prohibited exotic plants can be developed in New England and neighboring states, it would decrease the likelihood

of the spread of these plants to new waterbodies.

During 2002-2003 New Hampshire's Exotic Aquatic Plant Program Coordinator attended various planning meetings in other states, at their request, to assist in developing exotic plant legislation and promoting successful programs like Weed Watchers.

Additionally, in an effort to promote further cooperation among the New England states and the northeast area in general, New Hampshire is active in various professional organizations associated with exotic species control and outreach activities. Goals of these organizations include fostering partnerships between states to reduce the transport of exotic plants, sharing success and failure information with regards to control practices, and strategizing to enhance existing programs and legislation to reduce the impacts of invasive plants. Following is a list of organizations with which NHDES is involved:

- **Northeast Aquatic Plant Management Society (NEAPMS)**- State and regional government officials, academia, and plant management specialists are represented in this organization, the goal of which is to share resources and information concerning management practices and innovative technologies, as well as to provide a forum for interaction between government, academia, and managers.
 - In 2002 and 2003 two regional conferences took place that allowed for the exchange of information on various management strategies employed within the various states, as well as the development of new legislation and regulations, and the certification of new aquatic herbicides for use on exotic aquatic plants.
 - New Hampshire coordinated and led a panel discussion in 2002 on the various elements of each northeastern state's exotic species initiatives.
- **North American Lake Management Society (NALMS)**- This organization focuses on a variety of lake management issues, including exotic plant management and impacts to lake ecology as a result of exotic aquatic plant infestation. This organization is representative of state, federal, and regional government officials, academia, professional research organizations, and miscellaneous non-government officials and organizations. NALMS meets twice annually and also has regional chapters throughout North America that meet at least on an annual basis.
 - In 2003, New England was the host of the 23rd annual symposium of NALMS. A full day of sessions on exotic aquatic species was included on the agenda, and topics included milfoil genetics, milfoil management, and new invasives that are thought to be expanding their ranges towards northern New England.
- **NH Invasive Species Committee (ISC)**- This committee was established by RSA 430:54 in 2000. This committee is comprised of one representative from each state agency (including the Departments of Agriculture, Fish and Game, Environmental Services, and Resources and Economic Development), one representative from academia (UNH), one from the nursery industry, and three members at large from the public. The group is charged with developing a list of prohibited species to include terrestrial plants and animals (aquatic plants are already coordinated through DES, and aquatic animals

through Fish and Game) in New Hampshire, finding ways to enforce compliance with listed species, and developing education and outreach materials for target audiences that are affected by the list. This group meets on a monthly basis in Concord, NH.

- During 2002 and 2003 the DES Exotic Aquatic Plant Program Coordinator served as chair of the committee. During this timeframe the committee finalized the list of prohibited species and drafted regulations to be enacted by the Department of Agriculture.
- **Northeast Invasive Plant Group (NIPGRO)-** NIPGRO is an organization established by the US Fish and Wildlife Service to protect the resources of the Connecticut River and its watershed. The group focuses on both terrestrial and aquatic plants that are invasive in the states bordering the river system. The group supports the development of a region-wide plant atlas, the development of educational materials pertaining to each invasive species, and the sharing of information between the states. This group meets once annually, and hosts an informational ‘share fair’ once every three years.
 - During 2002 and 2003, DES assisted NIPGRO and its affiliates in establishing a regional atlas on terrestrial and aquatic plants.
- **Northeast Aquatic Nuisance Species Task Force (NEANSTF)-** This group is a regional panel of the National Aquatic Nuisance Species Task Force. The goals of this group are to assist the northeastern states and Eastern Canadian provinces in developing state, provincial, and regional Aquatic Nuisance Species Management Plans. There is a federal initiative to have each state develop its own management plan and submit it to the regional chapters for initial review, with subsequent filing with the national Task Force. The purpose of these management plans is to have states develop strategies for dealing with existing and potential infestations of exotic aquatic plants and animals that pose a threat to its water resources. Once a state has a developed plan the likelihood of federal technical and financial assistance is increased. The group is represented by state agencies across the northeast, and meets three times each year. In 2003, DES participated in a special focus group to develop a model guidance Rapid Response plan to be implemented by northeastern states.
 - During 2002 DES worked with other states to coordinate a panel discussion on the spread and distribution of water chestnut (*Trapa natans*) for a steering committee meeting of the Task Force.
 - During 2002 and 2003 NEANSTF held numerous strategizing meeting to develop a Rapid Response Protocol framework to be used by the various northeastern states and southeastern Canadian provinces.

3. PROGRAM COSTS

Beginning in 1981, exotic plant control activities were funded by a \$0.50 fee added to boat registrations. Then, in 1998, the legislature established the Lake Restoration and Preservation Fund and a fee of \$1.50 per boat registration was deposited in the fund for the Exotic Aquatic Plants Program. In 2003, program funds were again increased with the enactment of RSA 487:26, which established a Milfoil and Other Exotic Aquatic Plant Prevention and Research Fund. This new legislation added an additional \$3 fee per boat registration in the state. From this, DES anticipates an annual income of \$300,000, which will fund Milfoil and Other Exotic Aquatic Plant Prevention and Research Grants. Table 3-1 summarizes the breakdown of the \$5 boat registration fee.

Table 3-1
Program Funding (per boat registration)

| Program | Funding | Activities |
|--|----------------|---|
| Clean Lakes Program | \$0.50 | <ul style="list-style-type: none">• Lake and watershed studies• Sampling |
| Invasive Aquatic Plant Program | \$1.50 | <ul style="list-style-type: none">• Monitoring for exotic plants• Control grants• Benthic barrier supplies• Educational materials• Administrative costs |
| Milfoil and other Exotic Plant Prevention and Research Grant Program | \$3.00 | <ul style="list-style-type: none">• Funding for prevention grants• Funding for research grants |

Table 3-2 summarizes the income and expenditures for exotic plants related monies for each year this dedicated fund has been in place. A full summary of the 2002 and 2003 budgets for the Exotic Aquatic Plants Program can be found in Appendix 7. The expenditures for 2003 in Table 3-1 do not include the commitment of SFY 04 funds (see Appendix 7, note (3)).

The milfoil control fund pays 100% of the control costs for new infestations, up to 50% of the cost for subsequent control practices, and up to 80% of the costs for innovative control measures, with the remaining costs paid by local organizations, municipalities, or individuals. Figure 3-1 illustrates the DES expenditures for exotic plant control grants, and matching grants from municipalities and lake associations for each year of the program.

In FY 2002, the largest amount of money in the program's history was expended for control grants to local organizations for control practices. In FY 2003, the amount of funds available for control grants was reduced to compensate for the large expenditures in 2002, so as to maintain a positive fund balance. Because the requests for control grants are expected to continue to exceed the current budget income, DES developed a priority-rating model for funding control projects to be initiated during the 2004 season. A copy of the rating model is included in Appendix 8.

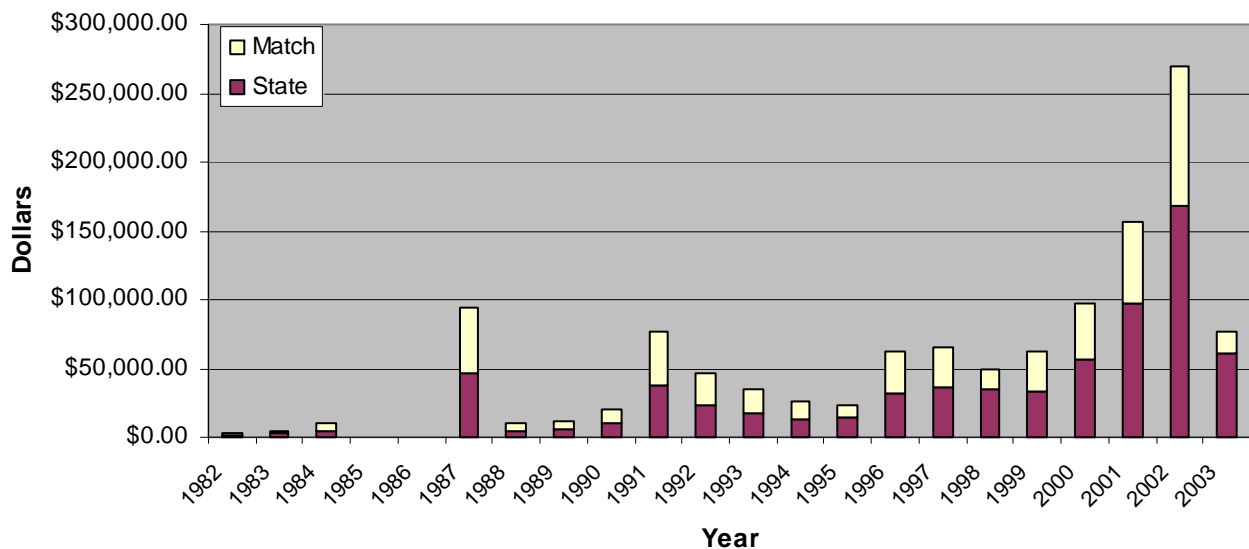
**Table 3-2
Program Income and Expenditures for 1982-2003***

| FISCAL YEAR | INCOME | EXPENSES | ENCUMBRANCES | BALANCE |
|--------------------|-----------------------|-----------------------|---------------------|---------------------|
| 1982 | \$12,258.50 | \$144.45 | | \$12,114.05 |
| 1983 | \$27,309.00 | \$1,214.31 | | \$38,208.74 |
| 1984 | \$24,387.50 | \$2,949.57 | | \$59,646.67 |
| 1985 | \$23,969.50 | \$7,201.50 | | \$76,414.67 |
| 1986 | \$36,026.50 | \$2.40 | | \$112,438.77 |
| 1987 | \$35,674.00 | \$47,138.04 | \$33.90 | \$100,940.83 |
| 1988 | \$38,701.50 | \$32,552.85 | \$9,270.90 | \$97,852.48 |
| 1989 | \$39,584.50 | \$60,569.02 | \$10,635.50 | \$75,503.36 |
| 1990 | \$42,784.00 | \$50,092.53 | \$15,351.61 | \$63,478.72 |
| 1991 | \$41,702.64 | \$35,384.19 | \$42,944.89 | \$42,203.89 |
| 1992 | \$39,267.50 | \$46,711.82 | \$6,763.72 | \$70,940.74 |
| 1993 | \$38,436.00 | \$48,870.21 | \$3,455.48 | \$63,814.77 |
| 1994 | \$38,299.88 | \$37,969.16 | \$16,941.11 | \$50,659.86 |
| 1995 | \$47,414.00 | \$57,011.20 | \$18,666.67 | \$39,337.10 |
| 1996 | \$43,790.00 | \$57,441.36 | \$12,573.92 | \$31,778.49 |
| 1997 | \$46,293.50 | \$34,247.75 | \$34,663.19 | \$21,734.97 |
| 1998 | \$145,809.00 | \$94,880.92 | \$25,333.22 | \$81,993.02 |
| 1999 | \$174,211.50 | \$129,486.71 | \$41,367.32 | \$110,683.71 |
| 2000 | \$226,455.00 | \$175,293.23 | \$80,510.62 | \$122,702.18 |
| 2001 | \$195,628.00 | \$259,223.99 | \$60,530.33 | \$79,086.48 |
| 2002 | \$205,487.00 | \$262,358.82 | \$80,512.00 | \$2,232.99 |
| 2003** | \$440,460.00 | \$234,736.82 | \$114,824.46 | \$173,643.71 |
| TOTALS | \$1,963,949.02 | \$1,675,480.85 | \$574,378.84 | \$173,643.71 |

*Values represent monies from both control and prevention/research funds

**Due to a near shortfall of funds in 2002 due to an increase in the numbers of plant management practices, conservative budgetary measures were followed in 2003, resulting in an increased FY End Balance shown for 2003.

Figure 3-1
Annual Expenditures for Exotic Aquatic Plant Control Activities



Grants for innovative milfoil control activities are made to lake associations that work with DES to develop a new or innovative control practice on their own. For example, since 1999 the Lake Massasecum Improvement Association (LMIA) in Bradford, New Hampshire has been receiving annual grants for innovative practices. The LMIA developed a net configuration system to attach to established RUAs to prevent milfoil fragments from being transported through drift and wind action. In addition, the LMIA developed a pontoon boat harvester to harvest milfoil multiple times during the summer months. It is thought that regular harvesting will inhibit the ability of the plants to photosynthesize and save plant energy to the rooting systems for the winter. If photosynthesis is restricted, the plants may weaken and die. At the end of the summer of 2002 and 2003, the milfoil plants appeared stunted in growth.

4. THE FUTURE

The goals of the Exotic Aquatic Plant Program are to limit the further spread of exotic aquatic plants, control new and existing infestations, and to research new ways to contain or even decrease the spread of these plants. Objectives in the five focus areas are:

Education and Outreach: Foster increased partnerships among lake associations, state agencies, regional groups, and other aquatic interests to provide and disseminate innovative and proactive educational materials that inform the public about exotic aquatic plants, how they are spread, and how they can be controlled.

Monitoring for Early Detection: Expand the Weed Watcher Program and coordinate training activities with volunteer monitors from other lakes management programs. Map infestations using global positioning systems to more accurately document and track the occurrence and distribution of infestations over time. Continue to develop DNA gene sequencing methods for positive identification of variable milfoil during all life stages.

Control: Develop a streamlined process, including appropriate monitoring and environmental assessment, for conducting herbicide applications.

Research: Conduct research on long-term control methods and potential means for eradication of exotic aquatic plants. With Dartmouth College, develop DNA gene sequencing methods for positive identification of variable milfoil during all life stages. With the University of New Hampshire, conduct further research on the impact of exotic plant infestations on lakefront property values.

Regional Cooperation: Foster partnerships with other states across the northeast region to better promote an understanding of exotic aquatic plants and their impacts on our water resources. Assist other states in developing and/or enhancing exotic species legislation.

Looking to 2004 and beyond, we would like the program to grow to meet the challenge of preventing new exotics infestations, controlling existing ones, and researching new techniques for control and even eradication of exotic aquatic plants. There is much to be done. Although we see growing resources available to combat exotic plants, we also see the increased spread of exotics to new waterbodies. We expect the recent dramatic increase in requests for control grants to continue, spurred by increased public awareness and interest.

The sections below summarize a vision for program activities in FY 2004 and 2005.

4.1 Education and Outreach

- ❖ Produce a colored poster depicting the fourteen prohibited exotic aquatic plants, distribute it free to the public and post it at boat launches, marinas, state and local offices
- ❖ Update and revise the “Frightful Fourteen” pamphlet
- ❖ In partnership with NHLA, work to continue annual implementation and expansion of the Lake Host Program
- ❖ Continue to publish a “Weed Watchers” newsletter each summer
- ❖ Produce a new Weed Watcher logo
- ❖ Produce Weed Watcher t-shirts or baseball caps for trained Weed Watchers (funding permitting)

- ❖ Update fact sheets and educational materials for distribution to the public
- ❖ Conduct plant identification and Weed Watcher workshops in conjunction with the annual Volunteer Lake Assessment Program Refresher Workshop and Lake Host trainings
- ❖ Give educational presentations to lake associations and other stakeholder groups
- ❖ Conduct a mailing to all BASS angler groups on Fish and Game's contact list
- ❖ Publicize the new milfoil control grant prioritization process through VLAP, UNH Lakes Lay Monitoring Program, the New Hampshire Lakes Association, and Weed Watchers
- ❖ Work with Fish and Game and the US Fish and Wildlife Service on the Pilot Communications Project for exotic species in New Hampshire
- ❖ Work with the Department of Transportation to develop a sign for posting at the state borders to warn boaters and other aquatic recreationists of invasive species problems in New Hampshire
- ❖ In 2006 prepare a 2004-2005 Program Report

4.2 Monitoring, Identification, and Prevention

- ❖ Train additional volunteer Weed Watchers to locate new exotic plant infestations earlier in the growing season
- ❖ Train VLAP volunteers in both native and exotic aquatic plant identification
- ❖ Locate and map individual infested areas of exotic aquatic plants using GPS
- ❖ Assist the Pesticide Control Board of the Department of Agriculture with aquatic herbicide permits and evaluations
- ❖ Continue to conduct inspections of aquarium stores and nurseries to investigate illegal sales of exotic aquatic plants
- ❖ Conduct 30-40 lake macrophyte surveys each summer
- ❖ Update prohibited exotic aquatic plant list in the rules per recommendations from academia, as well as trends in plant movement in the northeast
- ❖ Continue to provide updates to the University of Connecticut "Invasive Plant Atlas of New England" (IPANE)
- ❖ Continue to support the efforts of Lake Hosts and other groups that monitor public access sites to prevent the further introduction of exotic aquatic plants
- ❖ Work with lake associations on the eastern border of New Hampshire to educate them on the presence of Hydrilla in Maine, and to step up their monitoring programs for this and other invasive plants

4.3 Control

- ❖ Continue to explore avenues to increase funding for control practices
- ❖ Improve the application process for control grants, including an RFP and timelines that encourage permit application submittal by early fall of each year
- ❖ Continue to explore alternative methods of control through internet searches for activities in other states, through scientific literature reviews, and through attendance at exotic plant management symposia
- ❖ Award Research Grants to institutions of higher learning to explore new avenues for aquatic plant management
- ❖ Update, as necessary, Milfoil Control Grant Review Matrices for all future control activity requests for funding

- ❖ Document decisions for control techniques in accordance with the “Criteria to Evaluate the Selection of Aquatic Control Techniques” (See Appendix 6)

4.4 Research

- ❖ Explore ways to increase funding for research on invasive plants
- ❖ Provide grants for innovative research projects related to exotic aquatic plants from funds derived from the Milfoil Research Grant Program.
- ❖ Partner with state colleges and universities to conduct biological and ecological research on variable milfoil
- ❖ Continue to partner with Dartmouth College to work on milfoil genetics in New Hampshire, incorporating other lake parameters as determinants of milfoil infestation and dominance, with research findings and conclusions made available in 2004
- ❖ Work with the New Hampshire Lakes Association to solicit federal funds for increasing the level and intensity of research on variable milfoil

4.5 Regional Cooperation

- ❖ Attend invasive species conferences to keep up with current research methods, educational activities, control measures, and exotic aquatic plants programs
- ❖ Give presentations on New Hampshire’s programs to impart information on both the successes and needs for improvement in the various categories within the Exotic Aquatic Plant Program
- ❖ Assist neighboring and nearby New England states in promoting and drafting exotics legislation by giving presentations to appropriate legislative committees, if asked, and providing copies of New Hampshire’s legislation and annual reports
- ❖ Continue to actively participate in regional groups and organizations to expand resources and the knowledge base for New Hampshire’s program

4.6 Legislation and Regulations

- ❖ Continue to work with the legislature to evaluate the need for establishing a user fee for out of state boaters in New Hampshire. In 2002, a bill was introduced in the Senate to establish a user fee for out of state boats using New Hampshire’s waters. This fee would not interfere with reciprocity, but it would have given New Hampshire the ability to educate out of state boaters, and use the additional revenues to fund more prevention and research grants, as well as additional control projects. After being retained in committee between 2002 and 2003, the bill was deemed inexpedient to legislate (ITL) in 2003.
- ❖ In 2004, establish a fine schedule for the propagation, importation, purchase, sale, and introduction of exotic aquatic plants in New Hampshire.
- ❖ In 2004-2005, update the list of prohibited plants in the Env-Ws 1303.01 to include those plants that are seen to be expanding their range towards New Hampshire, as well as to include all species of milfoil.

References

Halstead, J.M., J. Michaud, S. Hallas-Burt, and J.P. Gibbs. 2001. An Hedonic Analysis of the Effects of an Exotic Invader (*Myriophyllum heterophyllum*) on New Hampshire Lakefront Properties. University of New Hampshire, Durham.

Appendix One

NHDES Exotic Aquatic Species Program

Clean Lakes Statutes RSA 487:15-RSA 487:25

And

Chapter ENV-Ws 1300 of NH Administrative Rules

CHAPTER 487

Control of Marine Pollution and Aquatic Growth

New Hampshire Clean Lakes Program

§ 487:15 Purpose. – The general court recognizes that rapidly escalating pressures of shorefront development and recreational uses of public waters have placed increasing strains upon the state's lake resources, thereby accelerating the eutrophication process in many of our public lakes through nuisance growths of aquatic macrophyton and phytoplankton (algae) and thus posing a threat to water quality. The general court further recognizes the need to restore, preserve and maintain the state's lakes and ponds in order that these significant environmental, aesthetic and recreational assets will continue to benefit the social and economic well-being of the state's citizens.

Source. 1990, 143:2, eff. June 18, 1990.

§ 487:16 Definitions. – In this subdivision:

I. "Department" means the department of environmental services.

II. The term "exotic aquatic weeds" includes only those species of vascular aquatic plants which were not part of New Hampshire's native aquatic flora before 1950. *Cabomba caroliniana* and *Myriophyllum heterophyllum* are examples of exotic aquatic weeds.

III. "Federal program" means the federal Water Pollution Control Act, 33 U.S.C.A. 1324, the federal clean lakes program (P.L. 92-500, section 314), as amended, now known as the Water Quality Act of 1987 (P.L. 100-4), as amended.

IV. "Commissioner" means the commissioner of the department of environmental services.

Source. 1990, 143:2, eff. June 18, 1990. 1996, 228:98, 99, eff. July 1, 1996. 1997, 185:2, eff. Jan. 1, 1998.

§ 487:16-a Exotic Aquatic Weed Prohibition. – No exotic aquatic weeds shall be offered for sale, distributed, sold, imported, purchased, propagated, transported, or introduced in the state. The commissioner may exempt any exotic aquatic weed from any of the prohibitions of this section consistent with the purpose of this subdivision.

Source. 1997, 185:3, eff. Jan. 1, 1998.

§ 487:16-b Exotic Aquatic Weed Penalties. –It shall be unlawful to knowingly, recklessly, or purposely offer for sale, distribute, sell, import, purchase, propagate, or introduce exotic aquatic weeds into New Hampshire waterbodies. Notwithstanding RSA 487:7, any person engaging in such an activity shall be guilty of a violation.

Source. 1999, 204:3, eff. Jan. 1, 2000.

§ 487:17 Program Established. – I. A program for the preservation and restoration of New Hampshire lakes and ponds eligible under RSA 487:20 shall be established and administered within the department of environmental services. Said program shall function to limit the eutrophication process in New Hampshire lakes by reducing nuisance growths of macrophyton and phytoplankton. It shall reinforce and complement the program authorized by the federal program and shall serve 3 basic purposes:

(a) To diagnose degraded lakes and ponds and implement long-term solutions for the purpose of restoring water quality where such solutions are feasible and cost effective.

(b) To diagnose lakes and ponds and implement methods for long-term preservation of the water quality when such measures can be shown to be feasible and cost effective.

(c) To provide short-term remedial actions which can effectively maintain water quality conditions adequate for public recreation and enjoyment, including, but not limited to, the control of exotic aquatic weeds pursuant to paragraphs II and III.

II. The department is directed to prevent the introduction and further dispersal of exotic aquatic weeds and to manage or eradicate exotic aquatic weed infestations in the surface waters of the state. The department is authorized to:

(a) Display and distribute promotional material and engage in educational efforts informing boaters of the problems with exotic aquatic weed control.

(b) Eradicate small new infestations of exotic aquatic weeds, according to the following criteria:

(1) The waterbody had been free, within the previous 5 years, of the exotic aquatic weed to be treated.

(2) The infestation is not widespread in the waterbody, and the department shall have determined that the exotic aquatic weed can in fact be eradicated from the waterbody.

(3) The most environmentally sound treatment technique relative to the specific infestation will be used, which also meets the requirements of state rules, including rules adopted under RSA 430.

(c) Develop an emergency response protocol to eradicate small new infestations. The protocol may include contractual agreements with one or more licensed pesticide applicators that would enable the prompt treatment of exotic aquatic weeds with herbicides consistent with the criteria provided in subparagraph (b).

(d) Designate, in consultation with the department of fish and game and the division of safety services, department of safety, restricted use of exotic aquatic weed control areas.

III. After notice and opportunity for hearing and comment, the department may make financial grants to lakefront associations, private businesses, citizens, and local governmental agencies for the management of exotic aquatic weeds where eradication is deemed impossible. All applications for grants by such groups shall be approved by both the department and the fish and game department, and shall meet state rule requirements.

Source. 1990, 143:2, eff. June 18, 1990. 1996, 228:100, 106, eff. July 1, 1996. 1997, 185:4, eff. Jan. 1, 1998.

§ 487:18 Project Prioritization. – Project approval shall be based upon prioritization factors to be established by rules adopted under RSA 541-A. Such rules shall give first priority for expenditure of available funds to the eradication of new infestations of exotic aquatic weeds pursuant to RSA 487:17, II(b) and second priority to all reasonable measures to control exotic aquatic weeds. Otherwise, preference shall be given to lakes that have public access or that serve as a public drinking water supply. Implementation measures shall be based upon an assessment of potential success, technical feasibility, practicability, and cost effectiveness. Restoration and preservation projects shall include watershed management plans to control and reduce incoming nutrients wherever possible through best management practices. Repeated short-term solutions shall be discouraged where long-term solutions are feasible and cost effective. Treatments shall be designed to minimize any adverse effect upon fish and wildlife, their habitats, and the environment.

Source. 1990, 143:2, eff. June 18, 1990.

§ 487:19 Public Hearings. – No project for the implementation of a lakes restoration or preservation program shall be approved or initiated until at least 2 public hearings have been held on the project. Said hearings shall be held in one or more of the affected municipalities.

Source. 1990, 143:3, eff. June 18, 1990.

§ 487:20 Eligibility. – To be eligible for funding under this subdivision, a body of water shall be any freshwater lake or pond which meets priorities established under RSA 487:18. Lakefront associations, private businesses, citizens and local government agencies shall be eligible to apply for funding under this subdivision.

Source. 1990, 143:3, eff. June 18, 1990.

§ 487:21 Cost Sharing. – I. For diagnostic and feasibility studies where the federal government has made financial assistance available in the amount of 70 percent of the cost, the department may provide an amount not exceeding 30 percent of the total eligible costs as determined by the department. Where no federal funding is available, the department may provide an amount not exceeding 80 percent of the total eligible costs.

II. For implementation of restoration or preservation projects where the federal government has made financial assistance available in the amount of 50 percent of the costs, the department may provide an amount not exceeding 35 percent of the total eligible costs, as determined by the

department. Where no federal funding is available, the department may provide an amount not exceeding 80 percent of the total eligible costs.

III. For water quality maintenance programs, the department may provide an amount of funding not to exceed 80 percent of the total eligible costs, as determined by the department, except that for the eradication of new infestations of exotic aquatic weeds the state may assume 100 percent of the cost.

IV. The local cost share shall be the cost of a project remaining after taking into account any state and federal funding.

V. An amount up to 10 percent of the total available funding may be expended on research that addresses the problems of lake eutrophication and exotic aquatic weeds.

Source. 1990, 143:3, eff. June 18, 1990. 1996, 228:106, eff. July 1, 1996.

§ 487:22 Municipal Agreements. – Whenever a project requires a commitment of cooperative action or local cost sharing involving 2 or more municipalities, all participating municipalities shall execute an intermunicipal agreement relative to their respective obligations. No project which requires a local match shall be initiated with state funding until such an agreement, if applicable, has been approved by the legislative bodies of all the involved municipalities.

Source. 1990, 143:3, eff. June 18, 1990.

§ 487:23 Agency Cooperation. – The department shall make a concerted effort to integrate and coordinate the clean lakes program with other environmental management programs involving lakes and their watersheds, whether such programs fall within the jurisdiction of the department of environmental services or within that of another state department. The university system and the department shall maintain regular communication for the purpose of sharing data bases and other relevant information.

Source. 1990, 143:3, eff. June 18, 1990. 1996, 228:101, eff. July 1, 1996.

§ 487:24 Rulemaking. – The commissioner shall adopt rules, under RSA 541-A, relative to:

- I. The criteria to be used in the prioritization of grants for diagnostic or feasibility studies.
- II. The criteria used to determine the priority of implementation projects and maintenance projects.
- III. Contracting procedures with local governments or private businesses.
- IV. Application procedures to participate in the program.
- V. Criteria for the determination of project eligibility.

VI. Criteria governing the conduct of and reporting requirements on diagnostic and feasibility studies, implementation projects and maintenance projects.

VII. Designation of plants as exotic aquatic weeds as defined in RSA 487:16, II.

VII-a. Administration and enforcement of, and exemptions to, the exotic aquatic weed prohibition under RSA 487:16-a.

VII-b. Criteria governing the emergency response protocol under RSA 487:17, II(c).

VII-c. Designation of restricted use exotic aquatic weed control areas under RSA 487:17, II(d).

VIII. Any other matters that are necessary to implement the provisions of this subdivision.

Source. 1990, 143:3, eff. June 18, 1990. 1997, 185:5, eff. Jan. 1, 1998.

487:25 Lake Restoration and Preservation Fund; Addition to Boat Fee. –

[Paragraph I effective until January 1, 2008; see also paragraph I set forth below.]

I. The fee of \$5 collected under the provisions of RSA 270-E:5, II(a) shall be paid to the director of the division of motor vehicles. The director of the division of motor vehicles shall pay over said fee to the state treasurer who shall keep the fee in a special fund to be expended by the department of environmental services. The department shall use \$.50 of the fee for lake restoration and preservation measures, exclusive of exotic aquatic weed control, \$1.50 of the fee for the control of exotic aquatic weeds, and \$3 of the fee for the milfoil and other exotic aquatic plants prevention program. The department shall deposit the \$3 into a special account within the lake restoration and preservation fund which shall be used to administer the milfoil and other exotic aquatic plants prevention program. The special fund shall be nonlapsing. All funds received under this section are continually appropriated to the department for the purposes of this subdivision.

487:26 Grant Program Established. –

[Repealed effective January 1, 2008.]

There is hereby established a grant program to be administered by the department of environmental services for the allocation of money to state agencies, non-profit organizations, and municipalities or political subdivisions of the state which seek to administer a milfoil and other exotic aquatic plants prevention program, and to institutions of higher learning which seek to conduct research on milfoil and other exotic aquatic plants remediation techniques. The grant program shall be funded by the portion of the lake restoration and preservation fund, established in RSA 487:25, and allocated to the milfoil and other exotic aquatic plants prevention program.

Up to 2/3 of the moneys distributed from the fund to the milfoil and other exotic aquatic plants prevention program shall be allocated for the purposes of milfoil and other exotic aquatic plants prevention and the remainder shall be allocated to milfoil and other exotic aquatic plants remediation research. Of the moneys in the milfoil and other exotic aquatic plants prevention program, the moneys allocated specifically for the purposes of the milfoil and other exotic aquatic plants prevention shall be distributed upon approval of the commissioner of the department of environmental services and the commissioner of safety. Of the moneys in the milfoil and other exotic aquatic plants prevention program, the moneys allocated specifically for the purposes of milfoil and other exotic aquatic plants remediation research shall be distributed upon approval of the commissioner of the department of environmental services.

Source. 2002, 201:3, eff. Jan. 1, 2003.

487:27 Management Plan. –

The commissioner of the department of environmental services, or designee, in consultation with the commissioner of safety, or designee, shall establish a management plan to implement the grant program. The management plan shall include, but not be limited to:

- I. Eligibility determination criteria and procedures.
- II. Application requirements and procedures.
- III. Project selection and prioritization requirements and procedures.
- IV. Stewardship requirements and procedures, including annual reporting to the department by the grantee.

Source. 2002, 201:3, eff. Jan. 1, 2003.

487:28 Eligible Applicants; Matching Funds. –

I. The department of environmental services shall distribute funds for projects to further the purposes of this program only to eligible applicants. Eligible applicants shall include:

- (a) Publicly-supported nonprofit corporations exempt from federal income taxation under Section 501(c) of the Internal Revenue Code.
- (b) Municipalities or other political subdivisions of the state.
- (c) Institutions of higher learning.
- (d) State agencies.

II. All eligible applicants shall provide a minimum level of matching resources equal to 50 percent of the proposed program budget. The department may exempt institutions of higher learning from the required match. The cost-sharing match may be met through the use of in-kind services. Qualifying matching funds from the applicant may include, but are not limited to, municipal appropriations, private donations, federal funds, and the value of goods and services provided by the applicant.

Source. 2002, 201:3, eff. Jan. 1, 2003.

487:29 Milfoil and Other Exotic Aquatic Plants Prevention; Grant Fund Report and Budget. –

The department of environmental services shall submit an annual report, beginning on January 1, 2004, to the speaker of the house, president of the senate, and the governor and council which

shall include, but not be limited to, a description of prevention and research projects funded by the milfoil and other exotic aquatic plants prevention program and the extent of aid to municipalities or subdivisions of the state, non-profit corporations, and research institutions.

Source. 2002, 201:3, eff. Jan. 1, 2003.

ADMINISTRATIVE RULES

CHAPTER Env-Ws 1300 EXOTIC AQUATIC WEED CONTROL

Statutory Authority: RSA 487:24, VII-a, VII-b, and VII-c

PART Env-Ws 1301 PURPOSE AND APPLICABILITY

Env-Ws 1301.01 Purpose. The purpose of these rules is to implement RSA 487:16-a, which prohibits the sale, distribution, importation, purchase, propagation, transportation, or introduction into the state of exotic aquatic weeds, and RSA 487:17, II (d) relative to the designation of control areas for exotic aquatic weeds.

Source. #6852 eff 9-5-98

Env-Ws 1301.02 Applicability. These rules shall apply to people who live, work, and recreate on the lakes of New Hampshire, as well as people who own stores that sell exotic aquatic weeds.

Source. #6852 eff 9-5-98

PART Env-Ws 1302 CHAPTER DEFINITIONS

Env-Ws 1302.01 "Bottom barrier" means a semi-permeable, fine mesh screening, laid over an area of sediments in a lake to shade and physically inhibit plant growth.

Source. #6852 eff 9-5-98

Env-Ws 1302.02 "Commissioner" means the commissioner of the department of environmental services.

Source. #6852 eff 9-5-98

Env-Ws 1302.03 "Cultivar" means a cultivated species of plant for which there is no wild form.

Source. #6852 eff 9-5-98

Env-Ws 1302.04 "Department" means the department of environmental services.

Source. #6852 eff 9-5-98

Env-Ws 1302.05 "Exotic aquatic weeds" means "exotic aquatic weeds" as defined by RSA 487:16, II, namely "only those species of vascular aquatic plants which were not part of New Hampshire's native aquatic flora before 1950. *Cabomba caroliniana* and *Myriophyllum heterophyllum* are examples of exotic aquatic weeds."

Source. #6852 eff 9-5-98

Env-Ws 1302.06 "Herbaria" means collections of dried, pressed plants for the purposes of education and scientific study.

Source. #6852 eff 9-5-98

Env-Ws 1302.07 "Infested waters" means water and water bodies having populations of prohibited exotic aquatic weeds such as milfoil or fanwort.

Source. #6852 eff 9-5-98

Env-Ws 1302.08 "Limited infestations" means an infestation of 5 acres or less.

Source. #6852 eff 9-5-98

Env-Ws 1302.09 "Maintenance project" means the short-term control of an infestation of exotic aquatic weeds by treating the weeds directly rather than treating the cause of the infestation.

Source. #6852 eff 9-5-98

Env-Ws 1302.10 "New infestation" means an infestation that was not previously reported to the department.

Source. #6852 eff 9-5-98

Env-Ws 1302.11 "Restricted use area" means a marked area or marked areas of a water body where infestations of exotic aquatic weeds have been delineated in accordance with Env-Ws 1304, which is closed to entry by boaters, anglers, or other water users and their equipment, except in emergency situations where property or human life is endangered.

Source. #6852 eff 9-5-98

Env-Ws 1302.12 "Surface waters of the state" means "surface waters of the state" as defined by RSA 485-A:2, XIV, namely, "streams, lakes, ponds and tidal waters within the jurisdiction of the state, including all streams, lakes or ponds bordering on the state, marshes, water courses and other bodies of water, natural or artificial."

Source. #6852 eff 9-5-98

PART Env-Ws 1303 PROHIBITED EXOTIC AQUATIC WEEDS AND EXEMPTIONS

Env-Ws 1303.01 Prohibitions and Designation. The following exotic aquatic weeds, identified in "A Manual of Aquatic Plants" by Norman C. Fassett and "Aquatic and Wetland Plants of Northeastern North America" by Garrett Crow and C. Barre Hellquist, both copyrighted by The University of Wisconsin Press, shall be prohibited from being offered for sale, distributed, sold, imported, purchased, propagated, transported or introduced in the state, pursuant to RSA 487:16-a, because they pose a substantial threat to native species in the state:

- (a) *Myriophyllum heterophyllum*, commonly referred to as variable milfoil;
- (b) *Myriophyllum spicatum*, commonly referred to as Eurasian milfoil;
- (c) *Cabomba caroliniana*, commonly referred to as fanwort;
- (d) *Hydrilla verticillata*;
- (e) *Trapa natans*, commonly referred to as water chestnut;
- (f) *Myriophyllum aquaticum*, commonly referred to as parrot-feather;
- (g) *Potamogeton crispus*, commonly referred to as curly leaf pondweed;
- (h) *Lythrum salicaria*, *L. virgatum*, *L. alatum* and their cultivars, commonly referred to as purple loosestrife;
- (i) *Phragmites australis* or *P. communis*, commonly referred to as common reed;
- (j) *Egeria densa*, commonly referred to as Brazilian elodea;
- (k) *Hydrocharis morsus-ranae*, commonly referred to as frogbit;
- (l) *Butomus umbellatus*, commonly referred to as flowering rush;
- (m) *Najas minor*, commonly referred to as European naiad; and
- (n) *Nymphoides peltata*, commonly referred to as yellow floating heart.

Source. #6852 eff 9-5-98

Env-Ws 1303.02 Exemptions for Transportation. Transportation of any exotic aquatic weeds on any road or highway in the state shall be exempt from the transportation prohibition of RSA 487:16-a, if the following are true:

- (a) It is for disposal as part of a harvest control activity under the supervision of the department;

(b) It is for the purpose of identifying a species or reporting the presence of a species, and the exotic aquatic weed is in a sealed container; or

(c) It will be disposed of after removal from recreational watercraft and equipment, such as trailers, motors, fishing equipment, or diving gear.

Source. #6852 eff 9-5-98

Env-Ws 1303.03 Acceptable Means of Disposal.

(a) Any exotic aquatic weed shall be immediately disposed of away from water or moist areas where it might survive.

(b) Acceptable means of disposal shall include but not be limited to:

(1) Burning;

(2) Land filling;

(3) Disposing in a trash container;

(4) Desiccating; and

(5) Composting, if applied away from surface waters.

Source. #6852 eff 9-5-98

Env-Ws 1303.04 Exemptions for Preserved Specimens. Pursuant to RSA 487:16-a, the prohibitions listed in Env-Ws 1301.01 shall not apply to exotic aquatic weeds in the form of herbaria or other preserved specimens.

Source. #6852 eff 9-5-98

Env-Ws 1303.05 Exemptions for Research or Education. Pursuant to RSA 487:16-a, the prohibitions listed in Env-Ws 1303.01 shall not apply to exotic aquatic weeds being used in a controlled environment, such as in a laboratory for research or for educational display.

Source. #6852 eff 9-5-98

Env-Ws 1303.06 Exemptions for Field Experimentation. Pursuant to 487:16-a, the prohibitions listed in Env-Ws 1303.01 shall not apply to remedial actions in the field for the purpose of finding control mechanisms involving exotic aquatic weeds, which, based on the proposed use and safeguards for containment, will minimize the risk of harm to natural resources or their use in the state.

Source. #6852 eff 9-5-98

Env-Ws 1303.07 Notification Requirement.

(a) Any person other than an employee of the department acting in his or her official capacity, who participates in any of the above exempted activities, Env-Ws 1303.02 and Env-Ws 1303.04 through Env-Ws 1303.06, shall notify the department prior to or within 24 hours after performing such activity, by calling 271-3503.

(b) Notification is not required for disposal after removal from recreational equipment pursuant to Env-Ws 1303.02(c) and Env-Ws 1303.03.

Source. #6852 eff 9-5-98

PART Env-Ws 1304 IDENTIFICATION, NOTICE, DE-LISTING AND MARKING OF RESTRICTED USE AREAS

Env-Ws 1304.01 Designation and De-listing of Restricted Use Areas.

(a) The commissioner, in consultation with the executive director of the fish and game department and the director of the safety services division of the department of safety, shall designate as a restricted use area any area that contains a limited infestation of exotic aquatic weeds. Such areas shall include new infestations, infestations in areas with the high risk of fragmentation, or areas in waterbodies with previously documented infestations, but where treatments or management practices have removed all but a small area of exotics that can be contained with the establishment of a restricted use area, until such time that other management practices can remove the remainder of the population.

(b) After designation, a restricted use area shall be in place until the area is no longer infested subject to the criteria in (a) above, or until a period of 3 years has expired since the time of designation.

(c) When an infestation has been eradicated or cannot be successfully treated or managed within the 3-year time limit, or the 3-year time limit has been reached, the commissioner, in consultation with the executive director of the fish and game department and the director of the safety services division of the department of safety shall evaluate the designated site to determine whether they will de-list the restricted use area or extend the restriction on the area.

(d) The commissioner shall issue press releases to the newspapers in the towns surrounding the water body(ies) in which a restricted use area is designated or de-listed.

Source. #6852 eff 9-5-98; amd by #7570, eff 10-6-01

Env-Ws 1304.02 Notification Protocol. The commissioner, in consultation with the executive director of the fish and game department and the director of the safety services division of the department of safety, shall notify the public when a restricted use area has been designated or de-listed and when buoys are installed or removed.

Source. #6852 eff 9-5-98

Env-Ws 1304.03 Notice of Restricted Use Areas.

- (a) The department shall post signs warning of a restricted use area in accordance with Env-Ws 1304.04.
- (b) The commissioner shall publish the names of identified water bodies which contain restricted use areas in a press release.
- (c) Notice shall include the following information:
 - (1) The town(s) in which the water body containing the restricted use area is located;
 - (2) The name of the water body containing the restricted use area;
 - (3) The specific location of the infestation within the water body;
 - (4) The type of infestation; and
 - (5) The general dimensions of the restricted use area.

Source. #6852 eff 9-5-98

Env-Ws 1304.04 Delineation and Markers for Restricted Use Areas. The department or its designee shall mark restricted use areas using buoys and signs as specified below:

- (a) A minimum of 3 buoys and/or signs shall be used to delineate a restricted use area;
- (b) The buoys shall be placed not more than 300 feet apart;
- (c) The buoys shall be connected by rope with small floats every 8 feet;
- (d) At least 2 buoys and/or signs shall be placed at or near the shoreline to delineate a restricted use area if the area is adjacent to the shore; and
- (e) Buoys shall be removed at the end of each growing season, unless removed sooner pursuant to the de-listing process.

Source. #6852 eff 9-5-98

Env-Ws 1304.05 Type of Warning Buoy. The buoy which warns of a restricted use area shall:

- (a) Be a standard state danger buoy;
- (b) Be white and international orange in color;

(c) Have an orange diamond symbol with an X through it; and

(d) Read as follows: "Restricted Use Area, pursuant to RSA 487. NH Dept. of Environmental Services 603-271-3503."

Source. #6852 eff 9-5-98

Env-Ws 1304.06 Marking of Restricted Use Areas by Municipalities.

(a) Any municipality with a similar method of marking restricted use areas within municipal water supplies may request the department to approve the method, in lieu of Env-Ws 1304.04, by submitting a request in writing to the department.

(b) The department shall grant authorization to a municipality to mark municipal water supplies if the method of marking to be used by the municipality is equivalent or more stringent than the method identified in Env-Ws 1304.04.

Source. #6852 eff 9-5-98

Env-Ws 1304.07 Navigation Prohibition. Subject to Env-Ws 1304.08, no person or equipment, including boaters, anglers, or other water users, or private or commercial watercraft of any type, shall enter a restricted use area except in emergency situations where property or human life is endangered.

Source. #6852 eff 9-5-98

Env-Ws 1304.08 Lake Access. If an infestation occurs at an access point to a marina, private residence, or public or private access ramp, a bottom barrier shall be put over the infestation to keep it from spreading and the access point shall be left open.

Source. #6852 eff 9-5-98

Env-Ws 1304.09 Signs. The department shall post signs at marinas or public or private access sites notifying the public of restricted use areas and the signs shall:

(a) Be at least 8 ½ by 11 inches in size; and

(b) Read as follows: "This buoy marks a RESTRICTED USE AREA on this water body, designated pursuant to RSA 487:17. Please help prevent the spread of exotic aquatic plants by staying out of these areas."

Source. #6852 eff 9-5-98

PART Env-Ws 1305 MAINTENANCE AND REMOVAL OF BUOYS

Env-Ws 1305.01 Responsible Agency. The department shall maintain, inspect and remove buoys as follows:

- (a) The department shall install buoys during weekday office hours; and
- (b) The department shall remove the buoys at the end of each growing season, unless removed sooner pursuant to the de-listing process.

Source. #6852 eff 9-5-98

Appendix Two

NHDES Exotic Aquatic Species Program

Chronology of Key Events: 1981-2003

**NHDES Exotic Aquatic Species Program
Chronology of Events: 1981-1998**

1981

- The exotic aquatic weed control legislation (RSA 487-17 formally RSA 149-F:3) became law on August 22, 1981.
- Fifty thousand brochures describing the exotic aquatic weed control program were distributed to boat license agents, state rest areas, marinas and lake associations.
- Waterproof posters depicting how to stop the spread of exotic weeds to other waterbodies were designed and distributed by DES personnel. Posters were placed at high use boat launching facilities throughout the state.
- A television commercial describing the exotic weed control program aired on Channel 9, in Manchester.
- Articles on exotic weed control were placed in several of the states most read newspapers.
- Personnel from this department discussed the exotic weed control problem at many lake association meetings.
- Several exotic weed complaints were field investigated by DES personnel.

1982

- The Citizen Aquatic Weed Control Advisory Committee was formed.
- Educational material was distributed throughout the state to keep the public up to date on milfoil control. Boat license agents, state rest areas, boat marinas and lake associations received this material.
- Matching funds were awarded to Smith Cove Lake Association for mechanical harvesting of milfoil in Lake Winnepesaukee.
- Fifty lakes were surveyed for the presence of exotic weeds.
- A new infestation of milfoil was discovered in the outlet of Lake Waukewan by DES personnel. It was successfully eradicated with an aquatic herbicide.

1983

- The Smith Cove Lake Association in Gilford and the Wolfeboro Conservation Commission were awarded matching fund grants for the harvesting of milfoil in Lake Winnepesaukee.
- Educational material was distributed throughout the state.
- Fifty lakes were surveyed for exotic weed life by DES personnel.
- Several complaints or inquiries pertaining to exotic weeds were either field investigated or handled through correspondence.
- DES personnel presented several talks on weed control at lake association meetings during the summer.
- Correspondence to other states and countries experiencing exotic aquatic weed problems was initiated in order to obtain new or existing aquatic weed control techniques.

1984

- The Towns of Alton, Gilford, Meredith and Wolfeboro were awarded matching grants to mechanically harvest exotic milfoil in Lake Winnepesaukee.
- The West Alton Marina was awarded a matching grant to apply aquatic herbicide to their dock area to control milfoil.
- Educational material was distributed throughout the state.
- Fifty exotic weed surveys were performed throughout the state.
- A new infestation of milfoil was hand pulled at the boat launching facilities on Crescent Lake in Wolfeboro. SCUBA equipment was utilized during the operation.
- Several aquatic weed complaints were field investigated by DES personnel.
- Personnel from DES monitored a lake drawdown and dredging project that was undertaken to control exotic fanwort in Millville Lake in Salem.
- Several newspaper articles were published state wide pertaining to exotic aquatic weed control. The Boston Sunday Globe did an extensive feature story on exotic milfoil in Lake Winnepesaukee. "The Laker" in Wolfeboro printed an excellent article explaining the problem.
- DES personnel addressed the exotic plant control problems at lake association meetings during the summer.

1985

- Funding for exotic weed control was suspended due to a previously unknown legislative footnote. No weed control projects were funded this year.
- Fifty exotic weed surveys were performed on lakes throughout the state.
- Millville Lake was inspected for Cabomba growth following a dredging operation.
- Educational material was distributed throughout the state.
- DES SCUBA team removed a small patch of milfoil from Crescent Lake boat landing area in Wolfeboro.
- DES personnel addressed aquatic weed problems at lake association meetings.

1986

- Aquatic weed control program funds became available due to legislative action. However, no projects were funded that summer due to funds not being available in time.
- Fifty exotic weed surveys were undertaken during the summer months.
- Two papers entitled "A Review of Current and Experimental Methods for the Control and Management of Aquatic Milfoil" and "Answers to Questions Concerning Aquatic Milfoil in New Hampshire Surface Waters" were written for distribution to the public.
- Educational material was distributed to lake associations, boat marinas, and the general public.

- Millville and Crescent Lakes were intensely surveyed for exotic weeds.
- Personnel from DES addressed aquatic weed problems at lake association meetings during the summer months.

1987

- Matching funds were awarded to the Town of Alton to undertake a milfoil dredging project in Lake Winnepesaukee.
- SCUBA divers removed small milfoil infestations at the Crescent Lake boat landing in Wolfboro and in a section of the Winnepesaukee River in downtown Laconia.
- Two mechanical harvesting projects were planned for the summer. However, town officials could not obtain the necessary local funding to match the state's share.
- An attempt to dredge 10,000 square feet of milfoil and bottom substrate was canceled in Opechee Lake in Laconia. Heavy duty equipment became mired down in the deep muds near the milfoil infestation.
- Educational material was distributed throughout the state.
- Intensive exotic weed surveys were undertaken in seventeen lakes and ponds near Lake Winnepesaukee. These ponds were considered to be vulnerable to a milfoil infestation.
- Fifty exotic weed searches were performed on other state lakes.
- A grant of \$45,000 was awarded to the University of New Hampshire in Durham for Research on how to control exotic weed growth. Research was conducted in Back Bay in Wolfboro on Lake Winnepesaukee.
- Private citizens participating in the New Hampshire State Assisted Lay Monitoring Program were instructed to report the sighting of any new weed growths in their respective lakes and ponds. The manual used by these lay monitors has a special section on exotic weed life.
- Millville Lake in Salem was checked for any regrowth of fanwort after a dredging operation. There has been no sign of fanwort in the lake to this date.
- A news release concerning exotic weeds and their potential spread to other lakes was distributed throughout the state media system.
- DES personnel participated in a workshop entitled "Nuisance Aquatic Weeds in New England". This workshop was sponsored by the New England Association of Environmental Biologists.
- A 4" x 6" educational handout card depicting how exotic weeds can be spread to other lakes through boating activity was distributed to boat owners during registration of their respective boats.

1988

- The state initiated a "Weed Watcher Program" for lake residents. Volunteer weed watchers were given instruction kits which taught them how to look for exotic weeds in their respective lakes. Any weeds that were suspected to be milfoil or fanwort were submitted to the DES Biology Bureau for verification. The program was well received

by the public.

- Fifty exotic weed surveys were performed during the summer as well as many field investigations of exotic weed complaints.
- Matching funds were awarded to the Smith Cove Lake Association for the harvesting of exotic milfoil in Lake Winnepesaukee.
- Benthic barriers were installed in Lake Opechee to control a small area infested with milfoil.
- DES personnel assisted on a private dredging project to control milfoil in Lake Opechee.
- Hand pulling of small infestations of milfoil were undertaken in Flints Pond, Crescent Lake, Lake Opechee and the Winnepesaukee River.
- A boat inspection program to detect "stowaway" exotic plant fragments was initiated during the summer of 1988. Participating towns were given \$2.00 per boat inspection. A questionnaire was also filled out by each person going through the inspection. Educational material was handed out to all boaters using these inspection launch sites. Towns participating were Meredith, Alton, Center Harbor (Winnepesaukee) and Sunapee (Lake Sunapee).
- Exotic milfoil was found in Turkey Pond, Concord and Flints Pond in Hollis during routine exotic weed surveys.
- Several boat docking facilities and launch sites were checked for the presence of exotic weeds during the summer.

1989

- A matching grant was awarded to the Locke Lake Association in Barnstead for the purpose of chemically treating 40 acres of exotic milfoil. The chemical called Diquat was used to control the milfoil.
- Lake shore residents along the northwestern section of Opechee Lake were awarded a matching grant to dredge milfoil and the bottom muds that sustain the exotic weeds. This was undertaken during a fall drawdown of the lake.
- St. Paul's School, located in Concord, was awarded a matching grant to mechanically harvest and hydrorake milfoil in Library Pond and Lower School Pond. The grant also provided for the application of lime to selected milfoil beds to determine if there was a reduction in biomass. The lime experiment was intended to supplement the work previously undertaken on Lake Winnepesaukee in 1987.
- Fifty lake surveys were performed which included intensive searches for exotic weeds.
- Several complaints were investigated relative to sightings of exotic plants.
- A matching grant was awarded to lake residents in Paugus Bay in Laconia, for the purpose of controlling milfoil with a mechanical weed harvester. Boat movement through the area was impeded by the large amounts of exotic milfoil.
- Milfoil was confirmed to be growing in Contoocook Lake in Rindge. DES biologists spent a whole day mapping the extent of the problem in Contoocook Lake. Several meetings were scheduled between lake association residents and DES biologists to determine a course of action to curtail the milfoil infestation. After discussing the problem thoroughly with all concerned, it was decided that the use of an aquatic

herbicide would be the most efficient milfoil management tool available. During the winter months, plans were drawn up, permits obtained and a weed control firm was hired to complete the plan.

1990

- Exotic milfoil was found in Northwood Lake during a routine inspection. Initially it was thought to be a small localized infestation. A SCUBA team revealed later that the milfoil encompassed a larger area not seen during the boat inspection. Since this was a pioneer infestation of milfoil it was decided that the best course of action to control the problem would be through the use of the herbicide called Diquat. The entire lake was surveyed for the presence of milfoil towards the end of the summer. The survey revealed that the initial infestation had spread to about 75 acres of the lake shore. Invitation for bids to control this problem were sent out and the necessary permits were obtained with a target date set for the spring of 1991 for the application of the chemical Diquat. DES funded 100% of the project.
- Contoocook Lake in Rindge received a matching grant from DES to treat 70 acres of milfoil. Aquatic Control Technology Inc. was selected to treat the lake with liquid Diquat. Milfoil had entered the lake about three to four years earlier but was not brought to the state's attention until 1989.
- A small patch of milfoil (50'x10') was found at the Mast Landing boat launching site in Crescent Lake, Wolfeboro. To prevent boats from transporting the milfoil into nearby Wentworth Lake, DES personnel used Aqua Screen, a bottom barrier, to smother the plants. The screen effectively killed the milfoil and is still in place to prevent further plant growth.
- Fifty lake water quality surveys were completed during the summer. During the survey aquatic weeds were noted.

1991

- During the month of June, approximately 75 acres of exotic milfoil in Northwood Lake was treated with the herbicide called Diquat. Since the milfoil was new to the lake system, the entire cost of the weed control operation was funded by the Department of Environmental Services (DES).
- The Fish Cove Lake Association and Mt. View Marina, both located on Lake Winnepesaukee, had severe infestations of exotic milfoil that precluded the recreational and commercial value of the waters. They each received matching grants to fund the application of the herbicide Diquat. Crescent Lake in Wolfeboro, also received a grant to treat 35 acres of milfoil with Diquat.
- A "weed watcher" on Lake Winnisquam notified DES that exotic milfoil was found in the northern section of the lake. DES personnel confirmed the milfoil sighting and sent two SCUBA divers to cover the small milfoil infestation with Aqua Screen. Any "straggler" plants were hand pulled by the SCUBA divers.
- A "weed watcher" from Lees Pond in Moultonboro noticed that some stands of milfoil in

the pond were being eaten by some unknown animal. Closer inspection by DES personnel revealed that an aquatic moth was responsible for the apparent decline in the milfoil biomass. The aquatic moth was subsequently identified as Paraponyx allionealis. DES SCUBA divers observed and monitored the progress of the insect and mapped out the areas affected by the insect.

- A new sign warning lake residents that milfoil was growing in their respective lakes was designed and placed at the milfoil infested lakes, usually at the boat launching facility.
- Fifty lakes were surveyed for the presence of milfoil or other exotic weeds.
- DES personnel presented several talks on exotic weed control at lake association meetings during the summer months.
- Professional divers were hired to hand pull a new infestation of milfoil in Round Cove on Lake Winnepesaukee. This was a fifty-fifty match with the local residents. DES biologists monitored the project.

1992

- Round Cove located on Lake Winnepesaukee was given a matching grant to control a small encroachment of milfoil. A weed control firm was hired to apply liquid Diquat to the 5 acre cove. Mt. View Marina in Gilford was also given a grant to chemically control the obnoxious milfoil that interfered with boating activities.
- DES and the Town of Wolfeboro provided money for Brewster Academy to study the aquatic moth currently eating milfoil in Lees Pond in Moultonboro. The study examined the fundamental characteristics of the aquatic moth, such as food preferences, biomass consumption, and the life cycle. These studies were performed in Back Bay in Wolfeboro and Lees Pond. Initial tests performed in "live cages" showed that the insects will decrease milfoil if in sufficient numbers. DES personnel assisted the researchers at Brewster Academy during the summer.
- A new exotic weed Myriophyllum spicatum was discovered growing in Mountain Pond in the Town of Brookfield. Otherwise known as Eurasian milfoil, this plant can spread very quickly to other ponds. A decision was made to drain the small shallow pond in an attempt to freeze and dry out the hardy plants. The beaver dam holding back the lake was breached during the fall. The plan is to let the pond stay down for at least two years. Several trips were made to the pond to insure that local beaver were not plugging the opening in the dam. As a last resort the pond may need a spot treatment of herbicides to insure that it does not spread to other nearby waterbodies.
- Exotic milfoil was found growing in Lake Winnisquam in the Towns of Tilton and Belmont. The combined total affected area was 7.81 acres. Since this was a new infestation of exotic weeds, the state was mandated to fund 100% of the weed control process. The decision was made to treat the two small areas with the herbicide 2,4-D. A request for bids to treat the two areas was sent out during the fall of 1992. A contractor was hired to obtain all the necessary permit from the Division of Pesticide Control and to apply the granular 2,4-D to the sites in Lake Winnisquam. Unfortunately, the project ran into difficulties over the issue of a nearby business using the lake as a drinking water source. The treatment area was too close to the drinking water source. The project was

- denied by the Division of Pesticide Control.
- The Wentworth Lake association applied for a matching grant from the state to chemically treat thirty five acres of milfoil in nearby Crescent Lake, Wolfeboro. This project also was denied due to a drinking water issue and the use of the aquatic herbicide 2,4-D.
- As in previous years, educational material was distributed to the public, exotic weed signs were placed at boat launching sites and talks relating to the exotic weed problem were given by DES personnel. Also, many weed specimens were submitted to DES for identification. Fifty weed surveys were performed on selected lakes in conjunction with a survey of the current water quality status of each waterbody.

1993

- The following were awarded matching grants from the state for the purpose of controlling exotic milfoil:
 - a. Mt. View Marina - Gilford; herbicide; 2,4-D
 - b. Lake Shore Park - Gilford; herbicide; 2,4-D
 - c. West Alton Marina - Alton; herbicide; 2,4-D
 - d. Contoocook Lake Association - Rindge/Jaffrey; herbicide; Diquat

Each site was severely infested with exotic milfoil to the point that recreational and commercial activities were impaired.

- "Weed Watchers" found three more lakes that harbored suspected stands of milfoil. Lower Suncook Lake, Lake Wentworth and Broad Bay were the latest victims of the milfoil encroachment. DES personnel covered the small stand of milfoil in Lake Wentworth with a benthic bottom barrier. The barrier physically constrains the weeds and ultimately smothers the plants within a month. Suncook Lake in Barnstead had scattered stands of milfoil near the outlet section of the lake. DES SCUBA divers placed bottom barriers on the milfoil. Each of the 5 stands of milfoil took about 300 square feet of bottom barrier. Any separately growing plants were hand pulled by the divers. During the fall drawdown of Lower Suncook Lake DES personnel patrolled the affected area searching for new milfoil growths missed during the summer. Any patches larger than 25 square feet were covered with barrier while "straggler" plants were individually hand pulled. The milfoil in Broad Bay (Bay Marina) seems to be confined to an area not larger than two acres. Local residents concerned about the problem are hand raking and pulling the milfoil plants. This area will be looked at more extensively next spring in order to decide what type of management approach will be undertaken to control the problem.
- In 1991 Northwood Lake was chemically treated to control exotic milfoil. The plants came back during the summer of 1992 and 1993. After a meeting with the lake association and DES personnel, it was decided to draw down the water in Northwood below the normal winter drawdown level. It is hoped that a cold winter will kill the newly exposed plant life.

- Officials from the Lake Wentworth Lake Association found milfoil growing in a small cove near Albee Beach in Wolfeboro. They notified DES officials of its presence and location on the lake. The plants did not have all the necessary taxonomic features needed to correctly identify the milfoil to species. However, since the milfoil was suspected to be an exotic species, it was decided that something should be done to ensure that it does not spread to the rest of the lake. DES personnel decided to cover the small area with bottom barrier. Approximately 1500 square feet of bottom barrier (Aqua Screen) were installed over the milfoil plants.
- Each year a Volunteer Lake Monitoring Workshop is held at DES headquarters in Concord. This year an aquatic weed workshop was given as well as an overview of the exotic weed program. These two programs were well attended by lake volunteers.
- Lake association members from New York state concerned about the current milfoil spread in their state asked a representative of DES to give a talk on the New Hampshire exotic weed program. They are trying to get a similar program started in New York.
- A representative from DES gave a major exotic weed presentation at the annual "Bass Master" state chapter meeting held in Concord. Major emphasis was given to cleaning weeds from boats during the "Bass Master" competitions held at many lakes during the summer months.
- An exotic weed control talk was given at the annual "Lakes Congress" held at St. Paul's School in Concord. About one hundred representatives from the many lakes of New Hampshire attended the conference.
- A grant was given to Brewster Academy in Wolfeboro to do follow up studies on the insects that eat milfoil. DES personnel assisted on this project by supplying a dive team to perform some of the experiments. Local lake association people also got involved on this project.
- Approximately 300 weed watcher kits were given out to various lake associations throughout the state. Requests for the "kits" were received from other states.
- DES personnel periodically checked on the status of the Mountain Pond drawdown in Brookfield. Occasionally, beaver would attempt to plug up the breach in the dam. The mini drought experienced this summer took its toll on the exposed Eurasian milfoil plants. Once the plants dried up, land plants took their place.
- NH Fish & Game became the lead agency for the "Statewide Public Access Program." They have agreed to place DES exotic weed warning signs at all their new and existing public access points.
- Currently, a new exotic weed sign is being developed for distribution during the summer of 1994.
- Several routine exotic weed complaints were field investigated by DES personnel. Many suspect weeds were sent to the DES Limnology Center for identification.
- Fifty lake surveys to determine current water quality status were performed by DES biologists during the summer. A weed survey was undertaken during the survey. A search for exotic weed species was also performed on each lake or pond.
- Problems associated with milfoil and other exotic plants in NH generated several newspaper articles during the summer. This "free publicity" helped get the word out to the public informing them to be careful not to spread exotic weeds to other lakes and

- ponds through boating activities.
- A weed watcher from the northern section of Lake Winnisquam notified DES biologists that a small patch of milfoil had appeared in one of the coves. SCUBA divers successfully hand-pulled the plants before they spread to other sections of the lake.

1994

- Pioneer infestations of exotic milfoil were found in Lake Waukewan, Meredith; Cheshire Pond, Jaffrey; Broad Bay, Freedom; and Silver Lake in Tilton.

Lake Waukewan, Meredith -DES biologists found approximately 1.5 acres of the exotic milfoil in the outlet/canal section of Lake Waukewan during a routine water quality inspection. This same general area had milfoil in 1981 and was successfully treated and controlled with a chemical herbicide in 1982.

Cheshire Pond, Jaffrey -A resident on Cheshire Pond in Jaffrey reported sighting milfoil in a beach area. A DES biologist confirmed the milfoil to be exotic. The milfoil probably floated downstream from nearby Contoocook Lake ultimately taking hold in the pond. A temporary drawdown of the pond was initiated during the month of December in an attempt to freeze the milfoil plants.

Silver Lake, Tilton - Exotic milfoil was found in Silver Lake in Tilton by the University of New

Hampshire lay monitoring officials. DES responded to the problem quickly by hand pulling the plants and digging up the remaining plants during a fall drawdown of the lake. This site will be inspected in the spring of 1995 for signs of regrowth.

Broad Bay, Freedom -DES biologists had trouble identifying the milfoil at this site in 1993 because the plant did not exhibit flowers which are critical to a positive identification. However, in 1994 flowers did appear and the plant was identified as exotic milfoil. This site will be chemically treated in 1995.

- Three matching grants were awarded to lake associations in 1994 for the purpose of exotic weed control. They were as follows:

| <u>Association</u> | <u>Lake</u> | <u>Town</u> | Type <u>Exotic</u> | Control <u>Method</u> |
|------------------------|---------------|-------------|-----------------------|--------------------------|
| a. Locke Lake Assoc. | Locke Lake | Barnstead | milfoil | chemical |
| b. Meredith Yacht Club | Winnepesaukee | Meredith | milfoil | chemical |
| c. St. Pauls School | Turkey Ponds | Concord | milfoil | mechanical harvesting |

- DES biologists performed several underwater exotic weed surveys with the aid of SCUBA equipment. These surveys were done to get an accurate assessment of the milfoil infestations.

- A new sign designed to educate boaters was made and placed at many boat launches throughout the state.
- Northwood Lake in Northwood was lowered in November so that the state could replace the old dam. The lake was drawn down all winter and did slow down the milfoil growth along the shoreline.
- Several informational talks were presented at lake association meetings by DES biologists. A radio talk show on exotic weeds was aired in Lebanon, while a local TV station did a major news segment on the exotic weed control program.
- DES personnel went to a meeting in Vermont to discuss new methods of controlling exotic weeds.
- Several hundred “weed watcher kits” were requested by the public. This volunteer program has been very successful over the past few years.
- Several suspected exotic weed sightings by weed watchers or other concerned lake residents were investigated by DES biologists. Many samples were sent to the Limnology Lab for identification.
- Fifty more exotic weed surveys were performed during the summer. These surveys supplement the weed watcher efforts performed by volunteers.
- Five milfoil contracts were put out to bid in 1994. These weed control projects will occur during the spring of 1995.
- Mountain Pond in Brookfield, which originally had Eurasian milfoil is still empty. There is no sign of any milfoil in the small stream that flows through the empty pond.

1995

- The outlet section of Lake Waukegan in Meredith was treated with the herbicide called Aqua Kleen. Aquatic Control Technology, Inc. of Northborough was hired by DES to undertake the project. If the milfoil had not been controlled there was a good chance it may have spread through the rest of the lake. It would have been impossible to treat the main lake since the Town of Meredith uses the lake for drinking water. An inspection of the treatment area with SCUBA gear did not reveal any milfoil plants. The treatment was a success.
- Lower Suncook Lake in Barnstead had six acres of milfoil treated with the herbicide called Reward. Lycott Environmental Research, Inc. of Southbridge Massachusetts was hired by DES to perform the treatment.
- Crescent Lake in Wolfeboro was also treated with the herbicide called Reward. An inspection of the treated area in the fall revealed no milfoil. To date treatment efforts have kept milfoil from invading the main section of nearby Lake Wentworth.
- Mountain Pond in Brookfield is still drained. Still no signs of Eurasian milfoil.
- Eurasian milfoil was found growing in the Connecticut River in Charlestown. A large boat launching facility on the Vermont side of the river is used by fishermen from both states. Vermont officials were notified of the milfoil. They posted warning signs near the launch site. Leaflets informing the public about the milfoil were handed out to the boating public at a toll booth as they crossed from New Hampshire into Vermont.
- A “weed watchers wheel” was developed to distribute to the public to aid them in their search for exotic weeds. The wheel accompanied the standard “weed watcher kit” used

- by lake monitors.
- The proposal to treat Broad Bay in Freedom with herbicides was terminated due to time constraints and permitting problems.
- Contoocook Lake Association received a matching grant from the state to chemically treat small areas of milfoil. The herbicide called Diquat was used in this project.
- Several milfoil talks were given to lake associations during the summer.
- Benthic barriers were installed in a small cove on Wentworth Lake to control a small stand of milfoil.
- Milfoil was hand pulled in Lower Suncook Lake by SCUBA divers from DES.
- Eight proposed herbicide applications for the purpose of milfoil control were submitted to the Governor and Council for approval. The projects were as follows:
 - a. Broad Bay, Freedom
 - b. Lakeshore Park, Gilford
 - c. Mt. View Marina, Gilford
 - d. West Alton Marina, Alton
 - e. Winnisquam Lake, Belmont
 - f. Silver Lake, Belmont
 - g. Cobbetts Pond, Windham
 - h. Fish Cove, Meredith
- Exotic milfoil was found at Claire's Boat Landing on Lake Massabesic in Auburn. This lake is Manchester's water supply. Benthic barriers were placed on a large portion of the milfoil. The use of herbicides was not allowed due to the drinking water status of the lake. Manchester Water Works personnel moved the benthic barriers to other milfoil sites as needed.

1996

- Eight herbicide applications to control milfoil occurred during the month of June. They are as follows:
 - a. Broad Bay, Freedom
 - b. Lakeshore Park, Gilford
 - c. Mt. View Marina, Gilford
 - d. West Alton Marina, Alton
 - e. Winnisquam Lake, Belmont
 - f. Silver Lake, Belmont
 - g. Cobbetts Pond, Windham
 - h. Fish Cove, Meredith
- Two new infestations of milfoil were confirmed by the DES staff. Captain Pond in Salem and Lake Massasecum in Bradford now possess the nuisance weed.
- SCUBA divers checked Lake Waukewan for any signs of milfoil regrowth one year after it was treated. No milfoil plants were observed during the dive.
- Milfoil was discovered growing in the northern end of Lake Winnisquam.
- A milfoil education display was presented at the Fish and Game Department "Discover Wild New Hampshire Day."
- A similar display was also presented at "Celebrate Your Lakes Day" held this summer in Meredith.
- Milfoil informational talks were given throughout the summer at many lake association

meetings.

- A talk was given to the Fish and Game Department volunteer fishing instructors on how to look for exotic weeds throughout the state.
- Ken Warren attended a National Weed Control Conference held in Burlington Vermont in July. Several papers on new promising control techniques were presented.
- Benthic barriers were placed on a small infestation in Lake Winnisquam.
- Mountain Pond in Brookfield was checked for any regrowth of Eurasian milfoil. No plants were found during the inspection.

1997

- Six herbicide applications were performed in the spring to control nuisance growths of exotic aquatic plants:
 - a. Northwood Lake, Northwood
 - b. Lake Winnepesaukee, Mountain View Marina, Gilford
 - c. Lake Winnepesaukee, Meredith Bay, Meredith
 - d. Lake Massasecum, Bradford
 - e. Lake Winnepesaukee, Krainwood Shores, Moultonboro
 - f. Locke Lake, Barnstead
- Benthic barriers were placed in Heath Bog of Lake Wentworth, Wolfeboro, Lake Massabesic in Auburn, Lake Massasecum Bradford, as well as in small localized areas in other lakes.
- A new infestation of milfoil was documented at Claire's Boat Landing on Lake Massabesic in Auburn, and Powder Mill Pond in Hancock.
- SCUBA divers inspected several small infestations of milfoil and hand-pulled plants where they were encountered in low densities.
- Several displays were presented at summer events and festivals including "Celebrate Your Lakes Day", and "Discover Wild New Hampshire Day."
- Informative presentations were given at a number of lake association meetings throughout the summer.
- HB 181 was passed prohibiting a number of activities associated with exotic aquatic plants.

1998

- RSA 487:16-a went into effect on January 1, 1998. This new law prohibits the sale, distribution, importation, purchase, propagation, transportation, or introduction of 14 listed exotic aquatic plants in New Hampshire. The new statute also allows for the designation of restricted use areas on waterbodies.
- On September 5, 1998 new rules were enacted pursuant to RSA 487:16-a.

- Benthic Barriers were placed in Lake Winnepesaukee in Meredith, Lake Wentworth in Wolfeboro, Contoocook Lake in Jaffrey, Hopkinton Lake in Hopkinton, Lake Massabesic in Auburn, and Lake Massasecum in Bradford, as well as in small places in an additional 2-3 lakes.
- Maintenance hand-pulling activities took place at a number of lakes with new and existing milfoil infestations.
- The following herbicide applications were performed during the Spring:
 - a. Forest Lake, Winchester
 - b. Captains Pond, Salem
 - c. Sunrise Lake, Middleton
 - d. Contoocook Lake, Jaffrey
 - e. Lake Winnepesaukee, Gilford
 - f. Lake Winnepesaukee, Moultonboro
 - g. Lake Winnepesaukee, Tommy Cove, Meredith
- A number of summer lake festivals were attended by the Exotic Species Coordinator, including “Celebrate Your Lakes Day,” “Naturally Newfound,” “Discover Wild New Hampshire Days,” and Keene State College “Solarfest”.
- Several presentations were given to towns and lake associations throughout the state on exotic aquatic plants.
- Exotic species signs which are posted at boat launches throughout the state were revised to include the changes in legislation associated with exotic plants.
- A number of milfoil control activities were conducted this summer at Lake Massasecum in Bradford. Benthic barriers were installed, a restricted use area was established in the north cove, and a net was placed across the surface of the water (vertically in water column) to trap floating fragments of milfoil.
- 500 specimens of variable milfoil (*Myriophyllum heterophyllum*) were sent to the Army Corps of Engineers, Waterways Experimental Station in Vicksburg, MS for research on control methods. Garlon 3-A, a new herbicide that is thought to be more effective and environmentally sound than 2,4-D, was used to treat the plants. More extensive research will be conducted this spring.

1999

- Eurasian milfoil found in Lake Mascoma in Enfield. Numerous diving operations were conducted to hand remove the milfoil.
- ‘Suspicious patches of milfoil found in Horseshoe Pond in Merrimack and in Belleau Lake, Wakefield. Plants did not flower so positive identifications were not made. Plan to investigate again in 2000.
- Nine herbicide applications were conducted this year. Most were in various portions of Lake Winnepesaukee. Other treatments were conducted at the following waterbodies:
 - Contoocook Lake, Rindge
 - Lake Monomonac, Rindge
 - Captains Pond, Salem
 - Crescent Lake, Wolfeboro
 - Lake Wentworth, Wolfeboro

- Numerous presentations were given to lake associations about exotic plants

2000

- New Variable milfoil infestations documented in Little Squam Lake and Squam River, Holderness/Ashland, Danforth Pond, Ossipee, and Rocky Pond, Gilmanton.
- Re-investigations of the two suspect infestations of milfoil from summer of 1999 confirmed that the species of milfoil in Belleau Lake, Wakefield, and Horseshoe Pond, Merrimack were indeed the variable milfoil.
- Herbicide applications conducted at the following locations in 2000:
 - Lake Winnepesaukee, Meredith, Gilford, Center Harbor, Moultonboro, and Alton
 - Northwood Lake, Northwood
 - Locke Lake, Barnstead
 - Lake Monomonac, Rindge
 - Contoocook Lake, Rindge
- Innovative milfoil management activities taking place on Lake Massasecum, Bradford. Lake Association, through funding from NHDES, have constructed harvester to repeatedly harvest milfoil in northern cove of lake.
- RUA installed in Little Squam Lake to contain milfoil.
- Hand-pulling conducted on milfoil in channel connecting Big and Little Squam Lakes.
- Research on milfoil impacts to property values initiated at UNH.
- RSA 487:16-b went into effect making it unlawful to knowingly, recklessly, or purposely offer for sale, distribute, sell, import, purchase, propagate, or introduce exotic aquatic weeds into New Hampshire waterbodies. The new law makes it a violation to conduct any of the above listed activities.

2001

- New Variable milfoil infestations documented in Lake Sunapee, Sunapee at Georges Mill, and Dublin Lake in Dublin.
- A new invasive plant was first documented in New Hampshire. *Egeria densa*, also known as Brazilian elodea, was found in Nutts Pond in Manchester.
- Herbicide applications conducted in 20 waterbodies, the most waterbodies ever treated in one summer in New Hampshire.
- Innovative milfoil management activities taking place on Lake Massasecum, Bradford. Lake Association, through funding from NHDES, have continued harvesting activities and installing bottom barriers.
- RUA installed in Little Squam Lake and Lake Sunapee to contain milfoil.
- Hand-pulling conducted on milfoil in channel connecting Big and Little Squam Lakes, Dublin Lake, and Lake Sunapee.
- Research on milfoil impacts to property values by UNH suggests a 16+% decline in lakefront property values.

2002

- New Variable milfoil infestations documented in Turtletown Pond in Concord, Balch Lake in Wakefield (plants found in 2001, but not in flower), Melendy Pond and Lake Potanipo in Brookline and in Brindle Pond in Barnstead.
- DES conducted 25 herbicide applications on various waterbodies throughout the state. This is the most number of treatments that have been conducted in any one year since the program began.
- Innovative harvesting activities continued on Lake Massasecum in Bradford.
- New Hampshire Lakes Association established a pilot Lake Host Program on several waterbodies.
- NHDES began working with Dartmouth College to sequence milfoil genetics and determine if hybridization is occurring.

2003

- RSA 487:25 was enacted on January 1, 2003, establishing the Milfoil and Other Exotic Aquatic Plant Prevention and Research Grant Program.
- First round of Milfoil and Other Exotic Aquatic Plant Prevention Grants awarded to three recipients. New Hampshire Lakes Association, Department of Safety, and Androscoggin River Watershed Council.
- Two new infestations of variable milfoil documented in Jones Pond in New Durham and in Scobie Pond/Haunted Lake in Franconia. Fanwort was also identified in Lake Massabesic, Auburn (this lake has variable milfoil as well). Barnstead Parade Dam Pond also has variable milfoil growing in it, though the Suncook River as a whole has patches of infestations, so this is not a 'new' infestation.
- Eurasian milfoil found growing again in Mountain Pond in Brookfield. It was assumed that this infestation was eradicated due to a 3-year drawdown of the pond. Five foot tall plants were found growing in August.
- 20 herbicide applications were conducted in 2003
- Dartmouth report on milfoil genetics released.
- DES and New Hampshire Lakes Association join forces to train lake hosts to monitor public access sites throughout NH
- DES studies new legislation concerning the use of grass carp for exotic plant control
- DES fund first control grant to treat Brazilian elodea in Nutts Pond, Manchester
- DES Biologists collect Hydrilla samples from Maine Lake to observe *in-situ* growth rates
- Second year of pet store and nursery inspections takes place to look for sales of prohibited exotic aquatic plants
- DES announces second round of prevention grants and first round of research grants.
- DES biologists provided the NH perspective on aquatic plant management at the NALMS National Conference in Mashantucket, CT.

Appendix Three

NHDES Exotic Aquatic Species Program

Education and Outreach Materials

ENVIRONMENTAL Fact Sheet



6 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.state.nh.us

WD-BB-40

Revised 1999

Law Prohibits Aquatic Plants

As of January 1, 1998, the sale, distribution, importation, propagation, transportation, and introduction of exotic aquatic plants into the state of New Hampshire is prohibited (RSA 487:16-a). This new law was designed as a tool for lake managers to help prevent the spread of nuisance aquatic plants. It is hoped that by preventing their transport over land, their spread between lakes will be stopped.

The following is a list of prohibited exotic aquatic species in New Hampshire:

| Scientific Name | Common Name |
|--|-----------------------|
| <i>Myriophyllum heterophyllum</i> | variable milfoil |
| <i>Myriophyllum spicatum</i> | Eurasian milfoil |
| <i>Cabomba caroliniana</i> | fanwort |
| <i>Hydrilla verticillata</i> | hydrilla |
| <i>Trapa natans</i> | water chestnut |
| <i>Myriophyllum aquaticum</i> | parrot feather |
| <i>Potamogeton crispus</i> | curly leaf pondweed |
| <i>Lythrum salicaria</i> , <i>L. virgatum</i> , <i>L. alatum</i> | purple loosestrife |
| <i>Phragmites australis</i> or <i>P. communis</i> | common reed |
| <i>Egeria densa</i> | Brazilian elodea |
| <i>Hydrocharis morsus-ranae</i> | frogbit |
| <i>Butomus umbellatus</i> | flowering rush |
| <i>Najas minor</i> | European naiad |
| <i>Nymphoides peltata</i> | yellow floating heart |

There are currently 41 waterbodies in the state with known exotic plant infestations. Milfoil and fanwort have been spreading between New Hampshire's waterbodies since the late 1960's. It is believed that these plants first entered the state's waterbodies from a discarded home aquarium. From there, these nuisance plants have spread to other lakes in the state primarily through boating activities. Water chestnut (*Trapa natans*) was recently discovered in the Nashua River. The other plants listed above have become nuisance species in other states, and may find New Hampshire's waters adequate for infestation.

How did this law come about?

Since the mid 1960's, various lakes around the state have been plagued by nuisance aquatic plants such as exotic milfoil and fanwort. Others that do not grow directly in water, but in moist habitats such as roadsides ditches and wetlands, have been spreading rapidly. The pretty purple flower known as purple loosestrife and the tall tufted reed known as common reed are becoming common sights in the state.

To prevent the further spread of these nuisance exotic plants, the NH Department of Environmental Services (DES) has drafted rules to make RSA 487:16-a enforceable. These rules include the above listed prohibited species which are already, or may quickly become, nuisance aquatic plants in New Hampshire.

Why are these particular plants a problem?

Plants which are native to a particular area have attracted a variety of predators including insects, animals, or pathogens (viruses/fungi) which prevent out-of-control plant growth. Exotic plants have been introduced into the state from areas that are both inside and outside of the United States. Because they are not native to the state, they have no natural predators to moderate their growth. Exotic species are thus able to flourish unchecked in any suitable habitat.

Once established in the state, exotic plants can take over large portions of the ecosystems to which they are introduced. They can cause a decrease in the aesthetic, recreational, and monetary value of New Hampshire's waterbodies. Exotic species can also pose a threat to many native species and valuable wildlife habitats.

How did these plants find their way to New Hampshire?

There are a variety of sources that are believed to have introduced exotic plant species into the state. Some of these sources are natural and are hard to control. A natural source may include the widening of the species range due to an increase in disturbed areas. Interstate transport of exotic plants may also occur when seeds and plant pieces become attached to migrating birds and waterfowl.

Other sources revolve around human activities. The sale of aquatic plants, dumping of aquaria into waterbodies, importation of plants for distribution or research, boats, vehicles, and trailers traveling between infested and uninfested waterbodies, and even fishing lures and bait buckets with plant pieces attached can all result in the statewide spread of the nuisance exotic plants. These activities though numerous, are more easily regulated than natural means of transport.

What can be done to prevent the spread of exotic aquatic plants?

Since the law went into effect, activities involving the 14 listed exotic plants can be effectively managed. To prevent the further spread of these species, always check your boats, motors, trailers, vehicles, fishing lures, bait buckets, and any other equipment that may have come into contact with any exotic plant or its habitat. Before you launch your boat and after you pull it out of the water, make sure that you don't have any tag-along plants. Remove all plants that are attached to your boat. Dispose of all plants away from the waterbody. Many launch sites have trash cans where you can dispose of these plants. **DON'T THROW THEM BACK IN THE WATER!**

If you are in any profession or have a hobby that puts you in contact with any exotic aquatic plants listed in the rules associated with RSA 487:16-a, please be aware of the new law. If you are a distributor or enthusiast of water garden plants, please collect and destroy all exotic aquatic species. There are many native aquatic plants that are suitable for sale and distribution within the state.

How does one effectively destroy exotic aquatic plants?

The best way to eliminate the threat which these plants pose is to insure that they are not able to be transported to an area where they are likely to reproduce themselves. Landfilling and burning (a permit may be required) are both appropriate means of disposal.

For those plants that are exclusively submerged, such as milfoil fanwort, or pondweed, alternative methods such as composting may be considered. However, the end product of composting should not be applied along shorelines of lakes and ponds, or along the banks of rivers and streams.

If you have any questions or concerns, or would like a copy of the law or the rules, please contact the DES Biology Bureau at (603) 271-3503.

ENVIRONMENTAL Fact Sheet



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WD-BB-4

1999

Weed Watchers An Association to Halt the Spread of Exotic Aquatic Plants

Milfoil (*Myriophyllum heterophyllum*, *Myriophyllum spicatum*) and fanwort (*Cabomba caroliniana*) are exotic aquatic plants that have become economic and recreational nuisances in some of New Hampshire's lakes and ponds. Dense stands of these plants inhabit shoreline areas frequented by water based recreationalists. Exotic plants can create the following problems:

- Displacement of beneficial wildlife.
- Reduction of aesthetic quality of lakes.
- Devaluation of waterfront property.
- Littering of beaches with plant fragments.
- Makes swimming difficult and dangerous.
- Snags fish lines and stunts fish life.
- Becomes tangled in outboard motor propellers.
- Chokes boat traffic lanes.
- Requires substantial funds for managing.

The spread of these plants to other uninfected waterbodies by transient boat traffic has increased over the last few years. If accidentally introduced into a lake, they grow at explosive rates. Many times new infestations are not discovered by state biologists until the weeds become a nuisance requiring expensive control methods. Once fully established, they are virtually impossible to eradicate. Therefore, education, vigilance, and early detection are key components in keeping these non-native nuisance weeds in check.

"Weed Watchers," a volunteer association dedicated to monitoring the lakes and ponds for the presence of exotic weeds, was formed by the NH Department of Environmental Services in 1988. Volunteers are given a special "Weed Watchers Kit" which contains the following:

- Photographs of exotic plants.
- Detailed drawings of the plants.
- An information bulletin on exotics.
- A list of lakes known to have exotic plants, including a map.
- Recommendations on how to conduct a plant survey.
- A complete set of fact sheets and pamphlets on exotics in NH.

The Weed Watchers Kit can be sent to you at no expense. Any individual wishing to participate in the "Weed Watchers" program should contact the Exotic Species Coordinator at:

Department of Environmental Services
Biology Bureau
6 Hazen Drive
PO Box 95
Concord, New Hampshire 03302-0095
(603) 271-3503

What does a Weed Watcher provide?

All that weed watching involves is a small amount of time during the summer months. Volunteers survey their waterbody once a month from June through August. To survey, volunteers slowly boat around the perimeter of that waterbody and any islands it may contain. Using the materials provided in the Weed Watchers Kit, volunteers will then look for any species that are of suspicion and send them to DES. After a trip or two around the waterbody, volunteers will have a good knowledge of its plant community and will immediately notice even the most subtle changes.

What happens if a Weed Watcher finds an exotic plant in a waterbody?

In most cases, volunteers will be instructed to send a plant specimen through the mail or deliver the specimen in person. Please try to collect a portion of the suspect plant when it is in flower. This may be the only way to precisely identify the plant. If the plant is an exotic, a biologist will visit the site to determine the extent of the problem and to formulate a plan of action to control the nuisance infestation.



ENVIRONMENTAL Fact Sheet

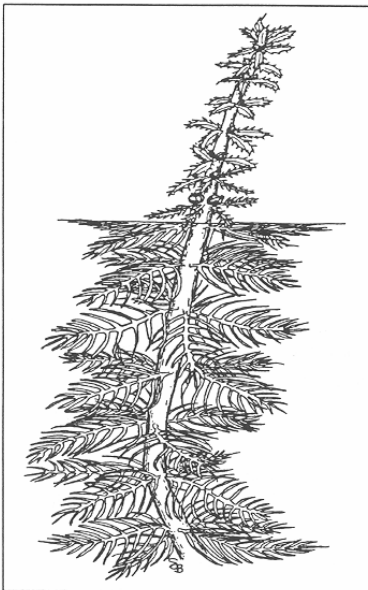


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WD-BB-23

Revised 2002

Variable milfoil *Myriophyllum heterophyllum* (Michx)



Species Description/General Information

Milfoil is a submerged aquatic plant with fine densely packed, feather-like leaves whorled around a main stem. It can grow up to 15 feet and may exhibit a three- to six-inch green spike-like flower above the waterline in July. A cross-section of the stem will reveal “pie-shaped” air chambers.

This exotic species of milfoil has been in the state since the late 1960s, and can currently be found in over 50 waterbodies in New Hampshire. There are six native milfoil species present in the state that do not cause problems. Eurasian milfoil is another non-native milfoil found in New Hampshire, but it is less of a threat than variable milfoil due to our water chemistry.

Why is Milfoil Considered a Nuisance Species?

This species is not native to our state and is very difficult to control once it becomes fully established. Milfoil reproduces through fragmentation whereby plant fragments break off from the parent plant through wind or boat action, grow roots, and settle in a new location. Milfoil spreads rapidly and displaces beneficial native plant life. It makes swimming difficult and can devalue waterfront property. Where this species grows in its native environment, insects and fish may feed on this plant at such a rate as to control its growth. In New Hampshire, milfoil has no natural predators to keep its population in check. Under optimum temperature, light and nutrient conditions, milfoil may grow up to an inch per day.

How Did Exotic Milfoil Become Established in This State?

It was most likely a “stowaway” fragment attached to a boat or trailer that came to this region. Milfoil can live out of water for many hours if it remains moist, like when it’s wound around a wet carpeted bunk on a boat trailer. Milfoil is usually first found near boat launch sites.

Another theory is that milfoil was introduced to a New Hampshire waterbody through the dumping of a home aquarium. This plant is sometimes used as an ornamental plant in fish aquariums.

Once Established, How Does Milfoil Infest Other Areas of a Waterbody?

Boat propellers will chop milfoil plants into small fragments. These fragments float on the surface and are at the mercy of the wind and lake currents. In a short time, roots form on these fragments. If washed ashore, these plants eventually take hold creating a new colony of milfoil. The cycle goes on until every suitable area is filled in with these weeds. An alternative form of the plants develops during low water. This vegetation type is more succulent than the submersed form.

What Methods Are Currently Being Used to Control Milfoil?

Three methods are currently used to control variable milfoil. Hand-pulling of new infestations is one way to prevent a full-lake infestation, but these patches must be detected early. When the plants become too large to hand-pull, a benthic barrier may be placed on the lake bed by State divers to compress the plants to the bottom and block sunlight. This works only in very small patches. The other method for controlling plants when they become too large to pull or cover is the use of an aquatic herbicide. These herbicides can provide one to three years of control in a waterbody.

There is no way to eradicate the plant once it has become well established in a waterbody. DES is currently working with Dartmouth College to determine the genetics of the milfoil plants and to see if there is a possibility for future genetic control of the plant.

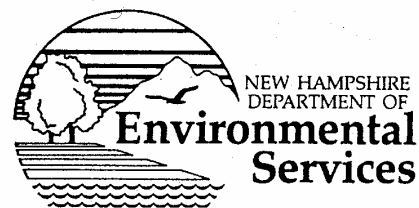
Have Chemicals Been Used to Effectively Control Exotic Milfoil?

One chemical treatment in the spring, during peak plant growth, is sufficient for milfoil control for the remainder of the treatment season, and perhaps into the next. Chemicals are usually the method of choice for small new infestations that are too large for hand-pulling or screening. However, attempts to eradicate extensive areas of weeds using chemicals are rarely effective. In most cases, the treated area becomes re-infested with fragments from other sections of the lake.

It is illegal to apply chemical herbicides to any New Hampshire waters unless you contract with a licensed applicator. The use of chemicals by an untrained person could jeopardize the health and welfare of the lake and its ecology. Inappropriate or inaccurate use of chemicals is life-threatening to people. It should be noted, however, that the state has been conducting herbicide applications for several years, and no negative impacts to non-target plants, animals, or humans have been observed.

For more information on milfoil or other Exotic Species, please contact the Exotic Species Coordinator at 603-271-2248 or asmagula@des.state.nh.us. Also, visit the Exotic Species website at www.des.state.nh.us/wmb/exoticspecies/.

ENVIRONMENTAL Fact Sheet



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WD-BB-24

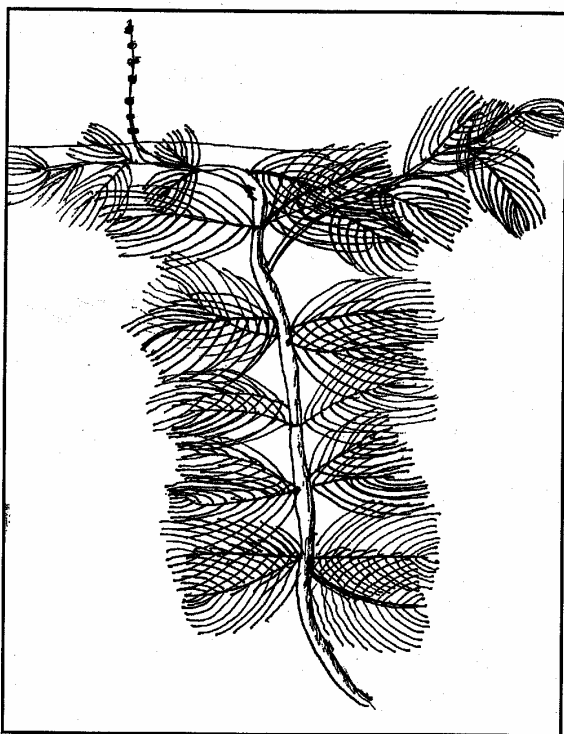
Revised 1997

WANTED!!

Information on the location of this exotic plant.

Eurasian Milfoil

(*Myriophyllum spicatum*)



Remove all plants from your boat and trailer before launching and when you leave.

Description

....submerged aquatic plant with whorled feather-like leaves that appear to have been clipped on the end. Eurasian milfoil can grow up to 10 feet and exhibits a reddish shoot near the surface. It forms dense mats of tangled plants in lakes and ponds.

General Information

Eurasian milfoil, which originally came to this country from Europe and Asia is a serious nuisance to many lake residents. **Once introduced to a lake (usually by boats) it grows and spreads very quickly, ultimately ruining valuable shorefront property.** Mountain Pond in Brookfield is the only New Hampshire waterbody sustaining this nuisance plant to date. However, this species can be found in nearby **Vermont and Massachusetts.**

Please inform DES if you see this plant.
603-271-3503

ENVIRONMENTAL Fact Sheet



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WD-BB-44

1999

Aquatic Plants and Their Role in Lake Ecology

Aquatic plants are a common sight in New Hampshire waterbodies, and many lake residents, as well as visitors to New Hampshire's numerous waterbodies, may question the importance and role of aquatic vegetation. One may ask whether these plants are beneficial or detrimental to the health of a lake ecosystem. This fact sheet will seek to address the most commonly asked questions and concerns regarding aquatic vegetation and their role in lake ecology.

What Types of Aquatic Plants Live In My Lake?

The most common types of aquatic vegetation are those which grow on the shoreland, those which grow partially within a waterbody (emergent), those which grow completely in a waterbody (submerged), and those which float on the surface of a waterbody. Even smaller plants called phytoplankton, commonly known as algae, are also present in our waterbodies. In most cases all of these vegetative types are present in a waterbody, creating a diverse aquatic habitat for a wide range of organisms. All types of aquatic vegetation are beneficial to a lake ecosystem provided they are native to New Hampshire waters.

What Are the Benefits of Aquatic Plants?

Aquatic plants provide many of the same functions as terrestrial plants. Aquatic plants provide a food source, habitat, removal of carbon dioxide, and production of oxygen through photosynthesis. Plants act as the producers in the ecosystem since they produce their own food as well as food for the consumers or animals of that ecosystem. Aquatic vegetation provides food for tiny microscopic animals called zooplankton, fish, waterfowl, moose and other mammals, and in some cases humans.

Aquatic vegetation also acts as a habitat. Submerged vegetation provides a habitat for small fish which may seek refuge from predators. They may also use this vegetation as spawning beds to lay their eggs. Emergent vegetation provides a habitat for certain songbirds, or wading birds who may nest at these sites or use them as feeding areas.

Not all aquatic plants are nuisances which require removal. Native plants provide many benefits to the lake including spawning and habitat areas for organisms in the lake, as well as fishing and wildlife viewing areas for the residents around the lake.

The wildlife that resides on a lake, as a result of healthy habitats, adds to its serenity. Melodies sung by songbirds, the cry of the common loon, the chirping of frogs, dazzling dragonflies, the painted turtle sunning itself on a rock, and even the majestic herons would be threatened if it weren't for the food and habitat which aquatic vegetation provide.

Aquatic plants also provide several items which humans use. Some of these include rice, cranberries, blueberries, fibers for rope, reeds for caning, herbs, medicinal compounds, and aesthetic items such as flowers and colorful fruits and berries for decoration.

What Happens If There Are Too Many Plants?

As lakes age, plant abundance will naturally increase. However, increased human impacts can cause the aging to occur prematurely. Too much aquatic vegetation within a waterbody may become problematic. Those plants which are not consumed by zooplankton, fish, or waterfowl are consumed in large rates by decomposing bacteria. Excess decomposition by bacteria may deplete oxygen reserves in a waterbody. An increase in decomposition of plant material (in the lower layers of a lake) can cause the build up of 'muck' at the bottom of a waterbody. This filling in, or "aging" of a waterbody can cause the depth to decrease and temperature to increase. A rise in temperature can cause more evaporation and even a lower amount of available oxygen for certain fish species. The addition of sand and sediment may also unnaturally fill a waterbody creating shallow areas for plants (perhaps exotic) to establish.

What Can Be Done To Limit Nuisance Amounts of Plant Growth?

As a lake resident or concerned citizen, be aware of the activities that take place within the watershed. Nonpoint source pollution is the most common means of nutrient transport into a waterbody. Runoff from roads, septic systems, lawns, and agriculture may bring with it much nitrogen and phosphorus. In freshwater, phosphorus is a nutrient that limits plant growth. The lower the phosphorus levels, the fewer the plants. The best way to protect a waterbody is by protecting its shoreland by maintaining a healthy, well-distributed stand of trees, saplings, shrubs, and groundcover, which act as a filter for nutrients and sediments. Other factsheets are available from DES by contacting the Biology Bureau at (603)271-3503.

Aquatic Plants Are a Natural and Beneficial Part of Your Lake

Aquatic plants are found in most lakes and ponds in New Hampshire. They are a natural component and vital link to a healthy and diverse aquatic ecosystem. When aquatic plants interfere with human activities, the plants may be quickly viewed as "weeds," or nuisances that must be removed. However, complete removal of native aquatic plants is not recommended. Not only is it costly and impractical, and may need a permit, it is detrimental to a healthy lake ecosystem. In addition, if the lake is cleared of its native aquatic vegetation, exotic aquatic vegetation may start to colonize the lake. This occurrence has been proven in a number of New Hampshire waterbodies where disturbances to native plant communities have taken place. Maintaining a balanced population of native plant life in a waterbody is the ultimate goal.

ENVIRONMENTAL Fact Sheet



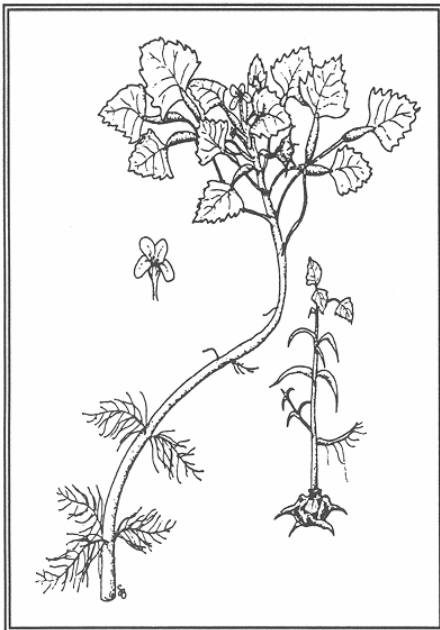
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WD-BB-43

1999

Water Chestnut Discovered in New Hampshire Waters

Water Chestnut (*Trapa natans*)



In July 1998, the NH Department of Environmental Services (DES) confirmed reports that the exotic aquatic plant water chestnut has infested the Nashua River in Nashua. Water chestnut can completely cover the surface of a waterbody and cause ecological hardship to native plants and animals. Fishing and boating can become extremely difficult as well.

This plant is not the same species as the edible water chestnut used in Asian cooking. Water chestnut is a member of the Trapaceae family and derives its name from the single-seeded horned fruits, the “chestnuts.” Each of the four horns on the nut is sharp and has a spine with several barbs. Each plant has two types of leaves: submerged leaves that are feather-like and oppositely paired along the stem, and waxy floating leaves that are triangular and form a rosette on the water’s surface. The petiole (leaf stalk) of the floating leaves has a bladder-like swelling filled with air and spongy tissue which provides buoyancy. Cord-like plant stems can attain lengths of up to 16 feet.

The water chestnut is an annual plant which exhibits great reproductive capacity. The seeds germinate in early spring. An individual seed can give rise to 10-15 rosettes, each of which can produce 15-20 seeds. Thus, one seed can produce 300 new seeds in a single year.

Water chestnuts begin to flower in mid to late July, with their nuts ripening approximately one month later. Flowering and seed production continue into the fall when frost kills the floating rosettes. The mature nuts sink to the bottom when dropped and may be able to produce new plants for up to 12 years. The plant spreads either by the rosettes detaching from their stems and floating to another area, or more often by the nuts being swept by currents or waves to other parts of the lake or river. The plant overwinters entirely by seed.

Water chestnut is a nuisance aquatic plant that limits boating and fishing in infested areas. It has the potential to infest wetlands and critical environmental habitats in other areas of the state.

ENVIRONMENTAL Fact Sheet



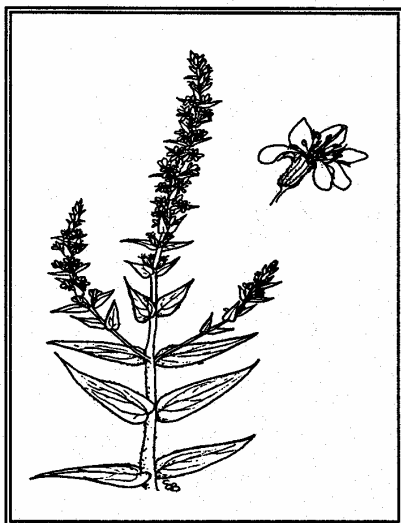
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WD-BB-45

1999

Purple Loosestrife: An Exotic Menace

Purple Loosestrife
(*Lythrum salicaria*)



Species Description

Purple loosestrife is an erect perennial herb standing 3-10 feet tall. Its average height is 5 feet. The plant blossoms from late June through late August with purple flowers that are located in long spikes at the ends of its branches. Its leaves are downy with smooth edges in whorls of three. One purple loosestrife plant may grow as an individual stalk or as several stalks clumped together. This plant has a woody tap root and a fibrous root system. Its stems have four angles and are woody at the base. As beautiful as this plant may appear, its beauty is deceptive, as purple loosestrife is gradually altering our nation's wetlands. Look-alikes of this plant are swamp loosestrife and blue vervain.

Species Range and Distribution

Purple loosestrife is not only a problem in New Hampshire but throughout North America and Canada as well. The northeastern United States and southeastern Canada are the areas experiencing the greatest impact of purple loosestrife. The distribution of purple loosestrife ranges from being common to abundant, and many areas have been found to support dense stands of this plant.

How Was Purple Loosestrife Introduced?

Purple loosestrife is native to Eurasia. It was originally introduced to eastern North America in the early to mid 1800's. This invasive plant was either accidentally introduced via ship ballasts, deliberately brought over as an ornamental plant, or its seeds may have been transported by imported raw wool and sheep.

Where Does Purple Loosestrife Invade?

Optimum habitats for purple loosestrife include freshwater marshes, open stream margins and alluvial floodplains. Purple loosestrife also invades wet meadows, pasture wetlands, cattail marshes, stream and river banks; lake shores, irrigation ditches, drainage ditches, and storm water retention basins. Purple loosestrife is often associated with cattail, reed canary grass and other moist soil plants.

What Makes Purple Loosestrife A Good Invader?

Purple loosestrife prefers moist organic soils, fluctuating water levels, and full sunlight. However, this plant can survive in many conditions associated with disturbed sites, such as construction sites for docks and marinas. It can tolerate a wide range of environmental conditions (temperature, sunlight, pH, nutrient levels) and can establish itself on a variety of substrates (gravel, sand, clay, and organic soil). Purple loosestrife has no natural predators (such as disease or insects) on this continent, therefore, it has an incredible ability to out-compete native vegetation and to form dense stands.

How Does Purple Loosestrife Spread?

Purple loosestrife's ability to spread contributes to its success as an invader. One adult purple loosestrife plant can produce 2.5-2.7 million seeds annually. Seeds from the plant are viable for many years. They may remain dormant in the soil until conditions are right for germination. These seeds are easily dispersed and transported by water, wind, bird feathers, animal fur, footwear, boats, boat trailers, and car tires. Purple loosestrife is also capable of re-sprouting from broken stems, underground roots, and plant fragments. If hand-pulled and any nodes are left in the roots, the plant will re-sprout. If mowed, the cut stem pieces will send out new roots and form new plants. The once commercial sale of purple loosestrife also increased the spread of this plant by introducing it to various wetlands and home gardens. It is now illegal to sell, purchase, propagate, import, distribute, and transport *Lythrum* species in New Hampshire.

Why Is Purple Loosestrife a Problem?

Purple loosestrife negatively affects both wildlife and agriculture. It displaces and replaces native flora and fauna, eliminating food, nesting, and shelter for wildlife. Purple loosestrife forms a single-species stand that no bird, mammal, or fish depends upon, and germinates faster than many native wetland species. If wildlife species are displaced, those that cannot move into new areas may be lost. By reducing habitat size, purple loosestrife has a negative impact on fish spawning and waterfowl habitat. The plant also diminishes wetland recreational capability such as boating, fishing, and hunting. This, in turn, may hurt local economies. Purple loosestrife affects agriculture by blocking flow in drainage and irrigation ditches and decreasing crop yield and quality.

What Are Some Solutions To The Purple Loosestrife Problem?

Three possible control methods exist for controlling the spread of purple loosestrife. These include physical, biological, and chemical means. None of these methods will completely eliminate purple loosestrife, but they will control the populations within ecologically acceptable limits.

Physical Control of purple loosestrife is possible for stands of smaller plants (less than 100 plants). It involves physically removing the plants from the soil at the root. Removal should ensure that all root and plant pieces are dug out of the soil. The best time to remove purple loosestrife from the soil is prior to seeding time just before the plant blooms. Removal after this time will not eliminate the seeds which have

already been produced by the plant. Once the plants are removed they should be burned or tightly bagged to prevent the spread of seeds or re-sprouting. Composting is not an alternative as the plants may regenerate in the compost pile. Many local conservation commissions, garden clubs, and other specialty groups throughout New Hampshire are initiating their own purple loosestrife monitoring programs involving mapping, hand-pulling, and disposal of this nuisance plant.

Biological Control is a method of control involving the release of predators to attack the pest species. Three different species have been used in North America to attempt to control purple loosestrife: two species of beetles, and one weevil. These three species are common in Europe where they combine to act on the leaves and roots, thereby controlling its populations. Several years of field trials will be necessary to determine whether biological control methods have real potential to effectively control purple loosestrife.

The New Hampshire Department of Agriculture (NHDA) and the New Hampshire Department of Transportation (NHDOT) are working on a joint project to introduce beetles into areas infested with purple loosestrife. The beetles feed on the plants, curbing their growth within a five year period, depending on the size of the infestation.

Chemical Control has not received FDA approval and the use of chemicals to combat purple loosestrife is many years away. In addition, special permits are required, and only licensed applicators may apply chemicals in or near a waterbody in New Hampshire.

What Can I Do To Help?

As a concerned resident of New Hampshire, there are many things you can do to help prevent the spread of purple loosestrife. The first step is to **recognize it**. Purple loosestrife is most easily identified when in bloom, before it goes to seed. The second step is to **report it**. If a large infestation is identified, you can contact NHDA, NHDOT, or NHDES. Mapping the infestation is helpful as well. The third step is to **remove it**. Check with authorities prior to removal, and always consult the landowner for permission. Your assistance is valuable in helping New Hampshire to combat the spread of this exotic menace.

ENVIRONMENTAL Fact Sheet



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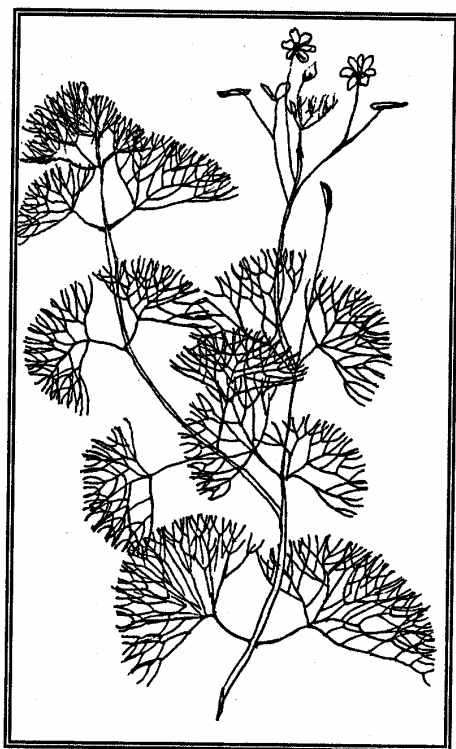
WD-BB-25

1999

WANTED!

Information on the location of this exotic plant

Fanwort (*Cabomba caroliniana*)



Please contact DES if you
have seen this plant.

Species Description

Fanwort is a submerged bright green aquatic plant with narrow leaves arranged in a fan shape manner oppositely located on a long narrow stem. Floating, lily-like leaves are found on the water's surface during flower production. Flowers are small, white, and emergent. This stem plant stands approximately 20 inches tall, with its slender stem coated in a gelatinous slime. Leaf segments are approximately 1mm wide. Fanwort flowers from July through September.

General Information

Fanwort is a native plant of the southern United States, and Latin and South America. It is currently found in Arlington Mill Reservoir in North Salem, Island Pond in Derry, Phillips Pond in Sandown, Mine Falls Pond in Nashua, and the Nashua River in Nashua. This exotic plant was discovered in New Hampshire in the late 1960s and entered the state via the back of a transient boat trailer or was dumped from a tropical fish aquarium. Characteristic of many exotic plants introduced to a new environment, Fanwort quickly invades shoreline areas of waterbodies, ultimately impairing recreational activities.

BEFORE YOU BOAT... KNOW WHAT YOU TOTE!

*It's up to YOU to control
aquatic nuisance species*



Zebra Mussels



Variable Milfoil



NOTICE TO BOATERS

Exotic plants and zebra mussels pose a significant risk to the health of New Hampshire's waterbodies. These aquatic nuisance species are transported via boats, trailers, fishing equipment, bait fish and bait buckets, diving gear and other aquatic recreational equipment. It's important to prevent zebra mussels, milfoil, and other aquatic nuisance species from being introduced to New Hampshire's waterbodies. Once established, it's impossible to eradicate these organisms, and management is very expensive. In addition, these exotic aquatic nuisance species each cause significant harm to native species of fish, plants and insects and their natural habitats.

HOW CAN YOU HELP?

LOOK for signs near boat launch sites. These signs warn of any aquatic nuisance species in a waterbody.

REMOVE all materials (plant or animal) from any equipment that has been in contact with an infested waterbody. Dispose of plant or animal material away from the waterbody.

Don't throw it back in the water.



Zebra Mussel

WASH AND DRY all equipment before using it again. Simply hosing off the boat, diving gear, or trailer may be enough. In some cases, a high-pressure and high-temperature (>140 d. F.) wash or light scraping may be necessary.

DRAIN AND FLUSH the engine cooling system and live wells of your boat, the buoyancy control device from diving equipment, and bait buckets of all plants and organisms.

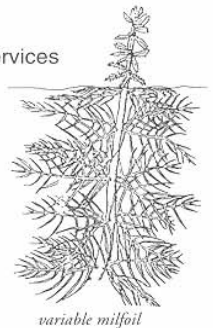
INSPECT your equipment before you launch into, fish, dive, or paddle on another waterbody.

REMEMBER, as of January 1, 1998, it is illegal to transport exotic aquatic plants in New Hampshire.

For more information, contact:

N.H. Department of Environmental Services
(Exotic Weed Program)
6 Hazen Drive
Concord, NH 03301
(603) 271-2963
www.des.state.nh.us

N.H. Fish and Game Department
2 Hazen Drive
Concord NH 03301
(603) 271-2501
www.wildlife.state.nh.us



variable milfoil

PUB99001-vy

Appendix Four
NHDES Exotic Aquatic Species Program
Examples of Boat Launch Signs

Exotic Plant Signs for Boat Launch Areas



Appendix Five

NHDES Exotic Aquatic Species Program

Management Plan for Implementation of the Milfoil and Other Exotic Aquatic Plant Prevention Grant Program Under RSA 487:27

**Management Plan for Implementation of the Milfoil
and Other Exotic Aquatic Plant
Prevention Grant Program
Under RSA 487:27**

January 2003

**New Hampshire Department of Environmental Services
6 Hazen Drive, PO Box 95
Concord, NH 03302-0095
603-271-2963
www.des.state.nh.us**

**in consultation with
New Hampshire Department of Safety**

Management Plan for Implementation of the Milfoil and Other Exotic Aquatic Plant Prevention Grant Program

January 2003

I. Introduction

Infestations of exotic plants are now documented in 48 of New Hampshire's 950 great ponds and in eight river systems. In the past 5 years, new infestations have appeared at a rate of 2 to 3 new waterbodies per year. A total of 50 waterbodies, including Winnepesaukee, Winnisquam, the Squam Lakes, and Lake Sunapee now have variable milfoil, one river has water chestnut, two lakes have Eurasian milfoil, six lakes have fanwort, and two ponds have Brazilian elodea. Excessive growth of milfoil and other exotics can impair fishing and swimming uses, substantially decrease shorefront property values, and disrupt the ecological balance of affected waterbodies. There are no known means of eradication of these exotic plants, so preventing their spread to new waterbodies is an important element of New Hampshire's long-term control strategies.

New Hampshire's Exotic Aquatic Species Program was improved during the 2002 legislative session by passage of House Bill 592. This legislation created the Milfoil and Other Exotic Aquatic Plants Prevention Grant Program (RSA 487:26-29; copy attached) funded by an additional boat registration fee of \$3 per boat. RSA 487:26 specifies that up to two-thirds of the monies collected are intended for milfoil prevention activities.

This management plan fulfills the requirement of RSA 487:27 that the Department of Environmental Services (DES), in consultation with the Department of Safety, develops a management plan to implement the Milfoil and Other Exotic Aquatic Plant Prevention Grant Program. Consistent with the requirements of RSA 487, this plan includes the following:

- (a) Eligibility determination criteria and procedures
- (b) Application requirements and procedures
- (c) Project selection and prioritization requirements and procedures
- (d) Stewardship requirements and procedures, including annual reporting to the department by the grantee.

The Milfoil and Other Exotic Aquatic Plant Prevention Program will be implemented as a collaborative effort between the Department of Environmental Services and Department of Safety.

II. Eligible Applicants

Under RSA 487:29, eligible applicants include:

- (a) Publicly-supported nonprofit corporations exempt from federal income taxation under Section 501(c) of the Internal Revenue Code.
- (b) Municipalities or other political subdivisions of the state.
- (c) Institutions of higher learning.
- (d) State agencies

To apply for grant monies, eligible applicants must complete a Prevention Grant Application Form provided by DES and submit other information as specified in this management plan. Selection will be based on responsiveness to these requirements and the application evaluation criteria as outlined in Section IX below. Costs are requested in the application to facilitate processing and ensure that the proposed level of effort for each application, and the cumulative grants awarded, are consistent with the available grant monies.

Applicants are encouraged to contact the Exotic Species Program Coordinator at 603-271-2248 or asmagula@des.state.nh.us to discuss project proposals before completing the application. To learn more about other program activities associated with the Exotic Species Program, visit the Exotic Species Program web pages at www.des.state.nh.us/wmb/exoticspecies/.

III. Eligible Projects

Prevention Grants may be awarded for any project to prevent the spread of milfoil and other exotic aquatic plants to new waterbodies or to prevent the spread of exotics to new, previously non-infested areas in an already infested waterbody. Examples include but are not limited to projects for boat inspections and boater education at lake access sites, education and outreach projects to increase knowledge and vigilance in prevention by the recreating public, and other projects or programs to actively prevent the spread of exotic aquatic plants.

IV. Program Requirements

Grantees will enter into a contract with the State of New Hampshire, administered by DES. State contracting rules and procedures will be followed, including use of standard state contract forms and conditions and approval of contracts. The minimum requirements for this grant program include:

- Applicants must demonstrate eligibility based on the requirements in RSA 487:28, I as described in Section II, above.

- Under RSA 487:28, II, applicants must provide a minimum level of matching resources equal to 50% of the proposed program budget. Qualifying matching funds may include, but are not limited to, municipal appropriations, private donations including those from nongovernmental organizations, federal funds, and the value of goods and services provided by the applicant. If goods, equipment, or nonprofessional services are to be procured by contract, applicants should conduct a competitive bid process for contractor selection. Professional services may be procured by qualifications-based selection. For volunteer labor and equipment, match valuation criteria include:
 - a. Volunteer labor can be included at a rate of \$15.00 per hour, other reasonable rate as documented by the applicant, or at the current professional rate for services provided.
 - b. Donated professional services may be valued a documented professional rate.
 - c. Donated equipment may be valued at market leasing rates.
 DES may exempt institutions of higher learning from the required match.

- Grantees must submit an annual progress reports and a final project report to enable DES to report to the legislature and the Governor and Council in accordance with the requirements of RSA 487:29. Copies of these progress reports must also be submitted to the Department of Safety.

V. Application Procedures

All applicants for grants must submit a completed Prevention Grant Application Form provided by DES (copy attached), a project narrative, and a project budget that concisely describes the scope of the project. Applications may be submitted electronically. For electronic submissions, Microsoft Word (.doc) or Adobe Portable Document Format (.pdf) are the preferred file formats.

Applications must be mailed or delivered before established deadlines to:

New Hampshire Department of Environmental Services
 Attention: Amy P. Smagula
 Exotic Species Program
 6 Hazen Drive, PO Box 95
 Concord, NH 03302-0095
 asmagula@des.state.nh.us

VI. Project Narrative Requirements

In addition to completing the application form, all proposals must include a project narrative that includes the following basic elements:

- A. Introduction
- B. Project purpose and goals: A description of what the project will accomplish with respect to exotic aquatic plant prevention activities. Goals should be clear and outcomes measurable.
- C. Project Narrative: Provide a description of what the project will do, who will do it, and how it will be implemented, in one or two pages. Include a description of where the work will take place, the target exotic aquatic plant species, and/or the target audience for outreach efforts, as applicable.
- D. Project Team: Describe major project team members including the project manager and other key personnel. Provide the background and experience of the project team as appropriate.
- E. Project Tasks: Describe each major task including what will be accomplished, who is responsible and the completion timeframes.
- F. Project budget as described in Section VII below.
- G. Local Support and Partners: Provide support documentation from any applicable groups, including but not limited to nearby landowners, watershed groups, public water suppliers, municipalities, water users, and other organizations with an interest in milfoil and other exotic aquatic plant prevention. Written permission is required for any landowner on whose property the project may take place.

VII. Project Budget

Applications should include a detailed budget using the budget form included in the application package, and must show both the costs to be paid directly by the grant and matching contributions as described above in Section IV.

VIII. Stewardship Requirements

All grant recipients must provide DES with an annual report by October 31 following the summer for which the grant was awarded. The report must include as a minimum, detailed descriptions of project activities, itemized accounts for the funds spent, and a summary of all outputs and results from project activities. Copies of these annual reports must also be submitted to the Department of Safety.

IX. Application Evaluation Criteria

An Exotic Aquatic Species Grant Review Committee will review and evaluate all proposals. The committee will include at least a designee of the Commissioner of the Department of Environmental Services, a designee from the Commissioner of the Department of Safety, and a designee from the Lakes Management Advisory Committee. Other state agency staff may also be involved in these reviews.

The evaluation criteria are described below:

Prevention Grant Application Evaluation Criteria

| Criteria | Weight | Score Range |
|-------------------------------|--------|---|
| Project Approach | 45% | 0-5 |
| Management Approach | 25 % | 0-5 |
| Community Benefit/Partnership | 20% | 0-5 (1 point for each partner in addition to applicant, for a total of 5 points) |
| Creativity | 10% | 0-5 |

Project Approach: Through the project narrative as described above in Section VI, the applicant should clearly state the goals of the project and how the goals will be achieved.

Management Approach: The applicant must demonstrate the capability to effectively manage the project to successful completion and project funding through a capable project team.

Community Benefit/Partnership: Does the project have the support of local partners, including towns, municipalities, abutters, or lake and watershed residents? Letters of support should be attached to the application.

Creativity: Is the project creative or innovative in ways that are likely to result in advances or improvements that are transferable across the state?

Upon review of all responsive applications based on the above criteria and considering the available funding, the Evaluation Committee will make recommendations to the Commissioners of the Department of Environmental Services and Department of Safety for their consideration. In accordance with RSA 487:26, grants shall be awarded and program moneys distributed upon approval of the Commissioners of Department of Environmental Services and Department of Safety. All grants are also subject to approval by the Governor and Executive Council prior to grant award.

Attachment A

Statutes applicable to the Milfoil and Other Exotic Aquatic Plant Prevention Grant Program

Section 487:26

[RSA 487:26 effective January 1, 2003.]

487:26 Grant Program Established. –

There is hereby established a grant program to be administered by the department of environmental services for the allocation of money to state agencies, non-profit organizations, and municipalities or political subdivisions of the state which seek to administer a milfoil and other exotic aquatic plants prevention program, and to institutions of higher learning which seek to conduct research on milfoil and other exotic aquatic plants remediation techniques. The grant program shall be funded by the portion of the lake restoration and preservation fund, established in RSA 487:25, and allocated to the milfoil and other exotic aquatic plants prevention program. Up to 2/3 of the moneys distributed from the fund to the milfoil and other exotic aquatic plants prevention program shall be allocated for the purposes of milfoil and other exotic aquatic plants prevention and the remainder shall be allocated to milfoil and other exotic aquatic plants remediation research. Of the moneys in the milfoil and other exotic aquatic plants prevention program, the moneys allocated specifically for the purposes of the milfoil and other exotic aquatic plants prevention shall be distributed upon approval of the commissioner of the department of environmental services and the commissioner of safety. Of the moneys in the milfoil and other exotic aquatic plants prevention program, the moneys allocated specifically for the purposes of milfoil and other exotic aquatic plants remediation research shall be distributed upon approval of the commissioner of the department of environmental services.

Source. 2002, 201:3, eff. Jan. 1, 2003.

Section 487:27

[RSA 487:27 added by 2002, 201:3, effective January 1, 2003.]

487:27 Management Plan. –

The commissioner of the department of environmental services, or designee, in consultation with the commissioner of safety, or designee, shall establish a management plan to implement the grant program. The management plan shall include, but not be limited to:

- I. Eligibility determination criteria and procedures.
- II. Application requirements and procedures.
- III. Project selection and prioritization requirements and procedures.
- IV. Stewardship requirements and procedures, including annual reporting to the department by the grantee.

Source. 2002, 201:3, eff. Jan. 1, 2003.

Section 487:28

[RSA 487:28 effective January 1, 2003.]

487:28 Eligible Applicants; Matching Funds. –

I. The department of environmental services shall distribute funds for projects to further the purposes of this program only to eligible applicants. Eligible applicants shall include:

(a) Publicly-supported nonprofit corporations exempt from federal income taxation under Section 501(c) of the Internal Revenue Code.

(b) Municipalities or other political subdivisions of the state.

(c) Institutions of higher learning.

(d) State agencies.

II. All eligible applicants shall provide a minimum level of matching resources equal to 50 percent of the proposed program budget. The department may exempt institutions of higher learning from the required match. The cost-sharing match may be met through the use of in-kind services. Qualifying matching funds from the applicant may include, but are not limited to, municipal appropriations, private donations, federal funds, and the value of goods and services provided by the applicant.

Source. 2002, 201:3, eff. Jan. 1, 2003.

Section 487:29

[RSA 487:29 added by 2002, 201:3, effective January 1, 2003.]

487:29 Milfoil and Other Exotic Aquatic Plants Prevention; Grant Fund Report and Budget. –

The department of environmental services shall submit an annual report, beginning on January 1, 2004, to the speaker of the house, president of the senate, and the governor and council which shall include, but not be limited to, a description of prevention and research projects funded by the milfoil and other exotic aquatic plants prevention program and the extent of aid to municipalities or subdivisions of the state, non-profit corporations, and research institutions.

Source. 2002, 201:3, eff. Jan. 1, 2003.

Appendix Six

NHDES Exotic Aquatic Species Program

Criteria to Evaluate the Selection of Aquatic Plant Management Techniques

**Criteria to Evaluate the Selection of
Aquatic Plant Control Techniques**
NH Department of Environmental Services
Water Division

Preliminary Investigations

I. Field Site Inspection

- Verify genus and species of the plant.
- Determine if the plant is a native or exotic species per RSA 487:16, II.
- Map extent of the plant infestation (area, water depth, height of the plant, density of the population).
- Document any native plant abundances and community structure around and dispersed within the exotic/nuisance plant population.

II. Office/Laboratory Research of Waterbody Characteristics

- Contact the appropriate agencies to determine the presence of rare or endangered species in the waterbody or its prime wetlands.
- Determine the basic relevant limnological characteristics of the waterbody (size, bathymetry, flushing rate, nutrient levels, trophic status, wetlands).
- Determine the potential impacts to downstream waterbodies based on limnological characteristics (water chemistry, quantity, quality).

Determination of Control Practice Based on Preliminary Investigations

Following are a series of control techniques which have been used in New Hampshire in the past, as well as some techniques which are still experimental. The most appropriate technique based on the determinations of the preliminary investigation should be selected. Applicable statutes are included at the end of this report, along with a copy of the Exotic Species Rules adopted September 5, 1998. These are the guidelines which were used to develop the criteria for the selection of a control technique.

Guidelines and requirements of each control practice are detailed below each alternative. A field sheet should be used in conjunction with this list to document the decision making process.

A. Hand-Pulling

- Can be used for exotic or native species.
- Can be used if infestation is in a small localized area.
- Can be used if plant density is low, or if target plant is scattered and not dense.
- Can be used if the plant could effectively be managed or eradicated by hand-pulling a few scattered plants.

- Use must be in compliance with the Wetlands Bureau rules.

B. Mechanically Harvest or Hydro-Rake

- Can not be used on plants which reproduce vegetatively (by fragmentation, ie milfoil, fanwort, etc.) unless containment can be ensured.
- Can be used only if the waterbody is accessible to machinery.
- Can be used if there is a dumping location available for harvested plant materials.
- Can be used if plant depth is conducive to harvesting capabilities (~ <7 ft. for mower, ~ <12 ft. for hydro-rake).
- Funds are available for repeated harvesting activities in that season.
- A navigation channel is required through dense plant growth.

C. Chemical Treatment

- Can be used if application of chemical is conducted in areas where alternative control techniques are not optimum due to depth, current, use, or type of plant.
- Can be used for treatment of exotic plants where fragmentation is a high concern.
- Can be used where species specific treatment is necessary due to the need to manage other plants (rare or endangered that will not be impacted by chemical treatment).
- Can be used if other methods used as first choices in the past have not been effective.
- A licensed applicator should be contacted to inspect the site and make recommendations about the effectiveness of chemical treatment as compared with other treatments.

D. Restricted Use Areas (per RSA 487:17, II (d))

- Can be used for exotic species only.
- Can be established in an area that effectively restricts use to a small cove, bay, or other such area where navigation, fishing, and other activities may cause fragmentation to occur.
- Can not be used when there are several “patches” of an infestation of exotic aquatic plants throughout a waterbody.
- Can be used as a temporary means of control.

E. Bottom Barrier

- Can be used for exotic or native species.

- Can be used in small areas, preferably less than 10,000 sq. ft.
- Can be used in an area where the current is not likely to cause the displacement of the barrier.
- Can be used early in the season before the plant reaches the surface of the water.
- Can be used in an area to compress plants to allow for clear passage of boat traffic.
- Can be used in an area to compress plants to allow for a clear swimming area.

F. Drawdown

- Can be used if the target plant(s) are susceptible to drawdown control.
- Can be used in an area where bathymetry of the waterbody would be conducive to an adequate level of drawdown to control plant growth, but where extensive deep habits exist for the maintenance of aquatic life such as fish and amphibians.
- Can be used where plants are growing exclusively in shallow waters where a drawdown would leave this area “in the dry” for a suitable period of time (over winter months) to control plant growth.
- Can be used in winter months to avoid encroachment of terrestrial plants into the aquatic system.
- Can be used if it will not significantly impact adjacent or downstream wetland habitats.
- Can be used if spring recharge is sufficient to refill the lake in the spring.
- Can be used in an area where shallow wells would not be significantly impacted.

G. Dredge

- Can be used in conjunction with a scheduled drawdown.
- Can be used if a drawdown is not scheduled, though a hydraulic pumping dredge should be used.
- Can only be used as a last alternative due to the detrimental impacts to environmental and aesthetic values of the waterbody.

H. Biological Control

- Grass carp cannot be used.
- Exotic controls, such as insects, cannot be introduced to control a nuisance plant.
- Research should be conducted on a potential biological control prior to use to determine the extent of host specificity.

Appendix Seven

NHDES Exotic Aquatic Species Program

Expenditures for Exotic Species Program

NHDES CLEAN LAKES AND EXOTICS PROGRAMS
FY 2002 REVENUES AND EXPENDITURES

| REVENUE FROM BOAT REGISTRATION FEES | | | | |
|--|------------------|------------------|--|------------------|
| Fee (\$/boat) | \$0.50 | \$1.50 | | |
| Fee Income | \$151,464 | \$48,003 | | \$199,467 |
| EXPENSES | | | | |
| 1. Personnel and related costs | | | | |
| 18-Overtime | \$2,268 | \$13,830 | | \$16,098 |
| 24- Computer maint. | \$0 | \$194 | | \$194 |
| 26- Membership fees | \$225 | \$230 | | \$455 |
| 28- Rent | \$1,084 | \$3,170 | | \$4,254 |
| 49 (DAS)(2)- Accounting | \$1,246 | \$3,810 | | \$5,056 |
| 50-Intern salary | \$14,625 | \$10,708 | | \$25,333 |
| 59- Full time staff salary | \$18,098 | \$13,158 | | \$31,256 |
| 60- Staff/intern benefits | \$5,308 | \$13,542 | | \$18,850 |
| 70- In-state travel | \$478 | \$2,319 | | \$2,797 |
| 80- Out of state travel | \$406 | \$7,093 | | \$7,499 |
| Total | \$43,738 | \$68,054 | | \$111,792 |
| 2. Laboratory, Equipment and Outreach Materials | | | | |
| 20- Supplies | \$8,457 | \$27,263 | | \$35,720 |
| 49- Lab analysis | \$0 | \$1,875 | | \$1,875 |
| 30-Equipment | \$583 | \$3,289 | | \$3,872 |
| Total Expenses | \$9,040 | \$32,427 | | \$41,467 |
| 3. Pass through by contracts | | | | |
| 90-Contracts | \$8,909 | \$101,273 | | \$110,182 |
| | | | | |
| Total Expenses | \$61,687 | \$201,754 | | \$263,441 |
| Ratios: Program Category:Total Expenses (%) | | | | |
| 1. Personnel | 70.90% | 33.73% | | 42.44% |
| 2. L., E. and O. | 14.65% | 16.07% | | 15.74% |
| 3. Pass Through | 14.44% | 50.20% | | 41.82% |

**NHDES CLEAN LAKES AND EXOTICS PROGRAMS
FY 2003 REVENUES AND EXPENDITURES**

| | PROGRAM ELEMENT | | | |
|--|-----------------|------------------|---------------------------|------------------|
| | Clean Lakes | Exotics Control | Prevention | Total |
| REVENUE FROM BOAT REGISTRATION FEES | | | | |
| Fee (\$/boat) | \$0.50 | \$1.50 | \$3.00 | |
| Fee Income(1) | \$51,122 | \$152,308 | \$237,030 | \$440,460 |
| EXPENSES | | | | |
| 1. Personnel and related costs | | | | |
| 18-Overtime | \$2,761 | \$6,923 | \$1,151 | \$10,835 |
| 24-Computer maint. | \$152 | | | \$152 |
| 26-Membership fees | | -\$90 | | (\$90) |
| 28-Rent | \$1,084 | \$1,617 | \$1,084 | \$3,785 |
| 49(DAS)(2)-Accounting | \$4,705 | \$351 | \$1,644 | \$6,700 |
| 50-Intern salary | \$5,068 | \$5,358 | | \$10,426 |
| 59-Full time staff salary | \$20,056 | \$18,560 | | \$38,616 |
| 60-Staff/ intern benefits | \$5,567 | \$11,174 | \$136 | \$16,877 |
| 70-In-state travel | \$1,430 | \$1,275 | | \$2,705 |
| 80-Out-of-state travel | | \$2,714 | | \$2,714 |
| Total | \$40,823 | \$47,882 | \$4,015 | \$92,720 |
| 2. Laboratory and Outreach Materials | | | | |
| 20-Supplies | \$11,684 | \$12,209 | | \$23,893 |
| 49(lab)(2)- Lab analysis | \$150 | \$3,150 | \$0 | \$3,300 |
| | \$11,834 | \$15,359 | \$0 | \$27,193 |
| 3. Pass through by contracts | | | | |
| 90-Contracts | \$0 | \$84,824 | \$187,215 (see note 3) | \$272,039 |
| Total Expenses | \$52,657 | \$148,065 | \$191,230 | \$391,952 |
| Ratios: Program Category:Total Expenses (%) | | | | |
| 1. Personnel | 78% | 32% | 2% | 24% |
| 2. Lab and Outreach | 22% | 10% | 0% | 7% |
| 3. Pass Through | 0% | 57% | 98% | 69% |

Notes:

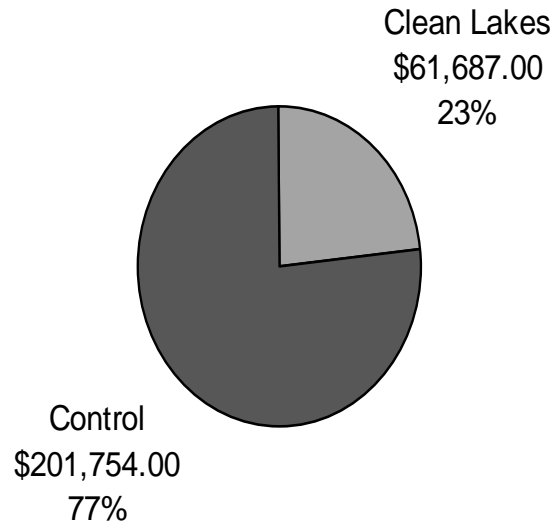
(1) This state fiscal year 03 table covers the period 7/1/02 through 6/30/03. Collection for prevention grants did not begin until 1/1/03 (by law). Typically approximately 100,000 boats are registered each year. In FY03 it was slightly higher and there

(2) Class 49 is for payment to other state agency accounts and includes both direct accounting services and lab costs.

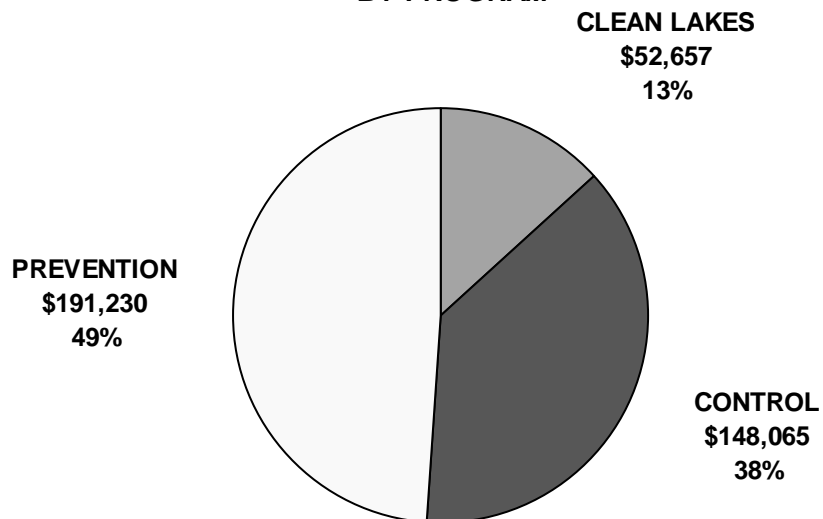
(3) Prevention grants were first awarded in May, 2003. Most actual expenditures for these contracts occurred in FY04. The costs presented here reflect the commitment of FY04 funds, not actual FY03 expenditures.

NHDES EXOTIC SPECIES PROGRAM EXPENSES BY PROGRAM AND CATEGORY

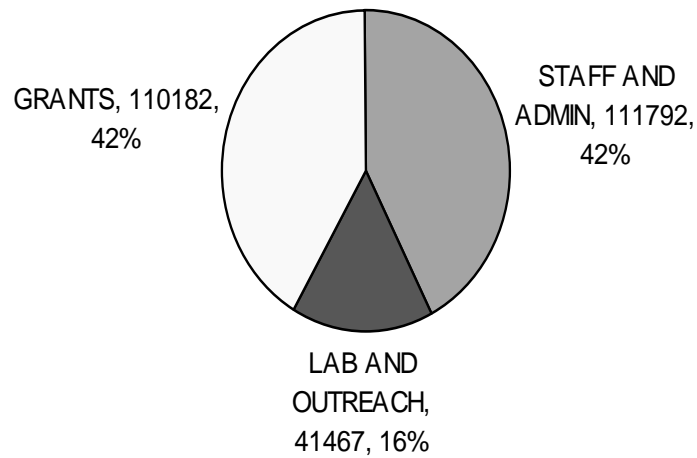
FY 2003 TOTAL EXPENSE BY PROGRAM



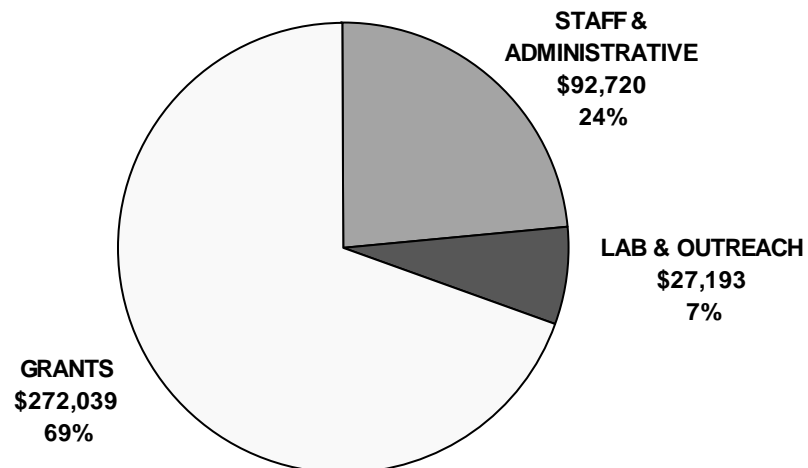
**FY 2003 TOTAL EXPENSE
BY PROGRAM**



FY 2002 TOTAL EXPENSES BY CATEGORY

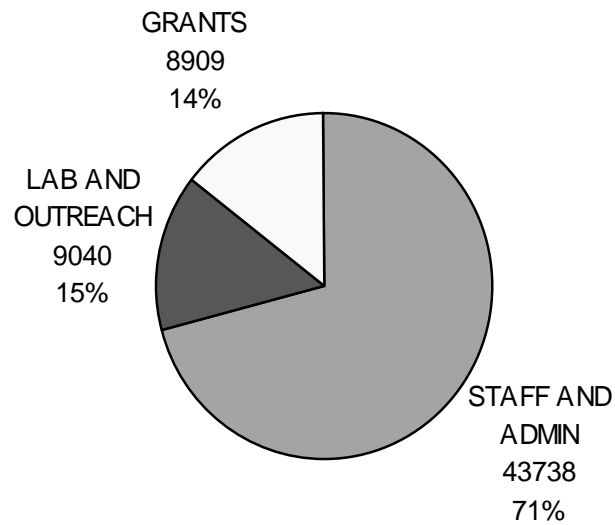


FY 2003 TOTAL EXPENSE BY CATEGORY

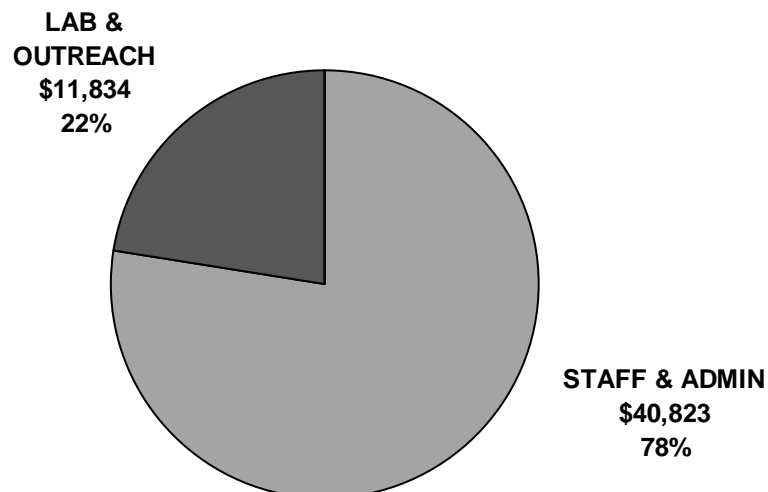


**NHDES CLEAN LANES AND EXOTIC SPECIES EXPENSES
BY CATEGORY AND PROGRAM**

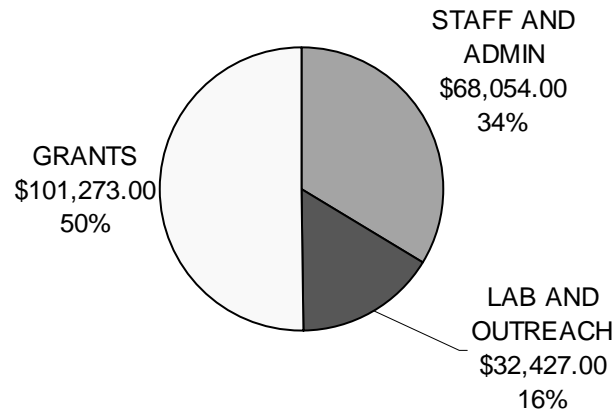
**FY 2002 CLEAN LAKES PROGRAM EXPENSES
BY CATEGORY**



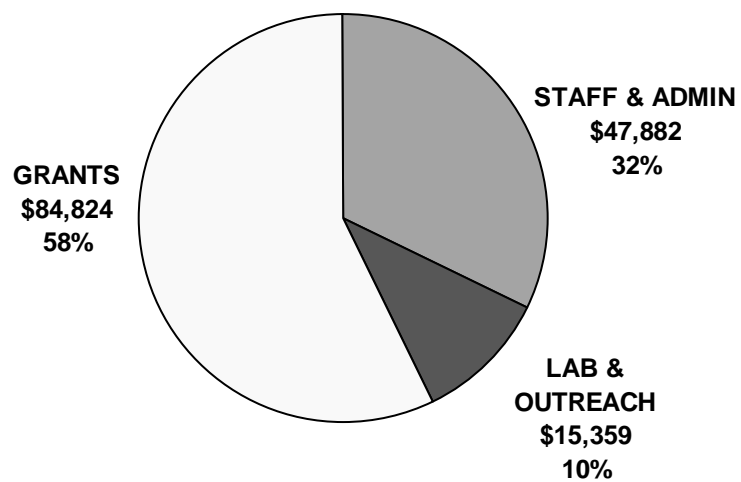
FY 2003 CLEAN LAKES EXPENSES BY CATEGORY



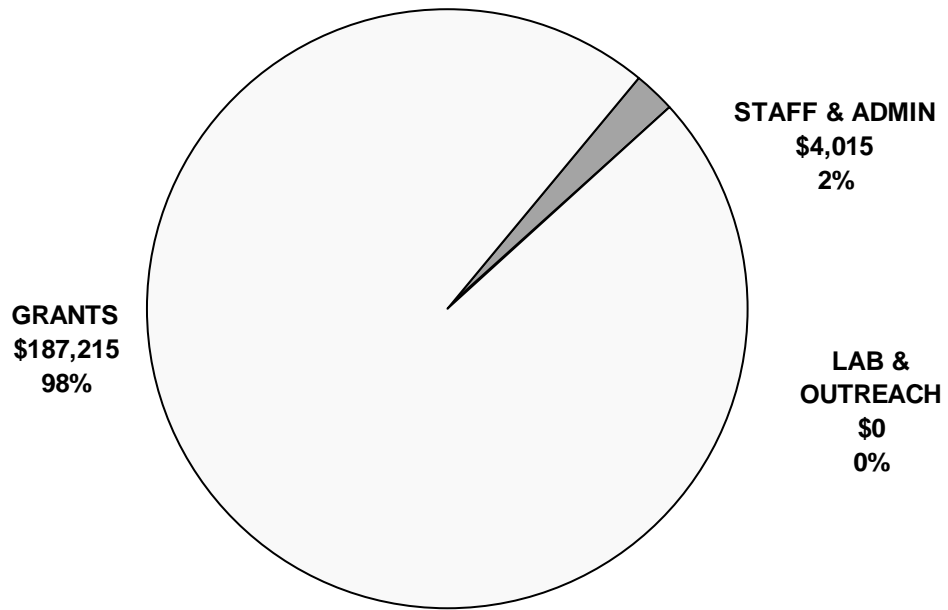
FY 2002 EXOTIC CONTROL EXPENSES BY CATEGORY



FY 2003 EXOTICS CONTROL EXPENSES BY CATEGORY



FY 2003 EXOTICS PREVENTION EXPENSES BY CATEGORY



Appendix Eight

NHDES Exotic Aquatic Species Program

Priority Rating Worksheets for Awarding Matching Grants for Exotic Plant Control Under RSA 487:18

**Priority Rating Worksheets for Awarding Matching Grants
for Exotic Plant Control Under RSA 487:18**

| LAKE | | SITE | | | | | | | | | | | |
|---|-----------------|------------------|-------------|-----------------|--|---|---|---|---|---|---|---|------|
| TOWN | | APPLICANT | | | | | | | | | | | |
| PRIORITY POINTS | | | | | | | | | | | | | |
| PUBLIC ACCESS <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="text-align: left;">Description</th> <th style="text-align: left;">Priority points</th> </tr> <tr> <td>Private pond</td> <td>0</td> </tr> <tr> <td>Public waters but no known public access</td> <td>1</td> </tr> <tr> <td>Public waters; public access is open land or beach but not a public boat ramp</td> <td>2</td> </tr> <tr> <td>Public waters; public boat ramp present</td> <td>3</td> </tr> </table> | | | Description | Priority points | Private pond | 0 | Public waters but no known public access | 1 | Public waters; public access is open land or beach but not a public boat ramp | 2 | Public waters; public boat ramp present | 3 | X2 = |
| Description | Priority points | | | | | | | | | | | | |
| Private pond | 0 | | | | | | | | | | | | |
| Public waters but no known public access | 1 | | | | | | | | | | | | |
| Public waters; public access is open land or beach but not a public boat ramp | 2 | | | | | | | | | | | | |
| Public waters; public boat ramp present | 3 | | | | | | | | | | | | |
| LAKE USE <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="text-align: left;">Description</th> <th style="text-align: left;">Priority points</th> </tr> <tr> <td>Few or no cottages; little or no transient use</td> <td>0</td> </tr> <tr> <td>Mostly residential use; mostly smaller boats and canoes</td> <td>1</td> </tr> <tr> <td>Both residential and transient use; larger boats</td> <td>2</td> </tr> <tr> <td>Public water supply</td> <td>3</td> </tr> </table> | | | Description | Priority points | Few or no cottages; little or no transient use | 0 | Mostly residential use; mostly smaller boats and canoes | 1 | Both residential and transient use; larger boats | 2 | Public water supply | 3 | X2 = |
| Description | Priority points | | | | | | | | | | | | |
| Few or no cottages; little or no transient use | 0 | | | | | | | | | | | | |
| Mostly residential use; mostly smaller boats and canoes | 1 | | | | | | | | | | | | |
| Both residential and transient use; larger boats | 2 | | | | | | | | | | | | |
| Public water supply | 3 | | | | | | | | | | | | |
| TYPE OF INFESTATION <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="text-align: left;">Description</th> <th style="text-align: left;">Priority points</th> </tr> <tr> <td>In flowing waters</td> <td>0</td> </tr> <tr> <td>Widespread and well established in lake/pond</td> <td>1</td> </tr> <tr> <td>Established in pond but spreading into new areas</td> <td>2</td> </tr> <tr> <td>Infestations have remained small or localized in pond</td> <td>3</td> </tr> </table> | | | Description | Priority points | In flowing waters | 0 | Widespread and well established in lake/pond | 1 | Established in pond but spreading into new areas | 2 | Infestations have remained small or localized in pond | 3 | |
| Description | Priority points | | | | | | | | | | | | |
| In flowing waters | 0 | | | | | | | | | | | | |
| Widespread and well established in lake/pond | 1 | | | | | | | | | | | | |
| Established in pond but spreading into new areas | 2 | | | | | | | | | | | | |
| Infestations have remained small or localized in pond | 3 | | | | | | | | | | | | |

| IMPACT OF INFESTATION | | | | | | | | | | | | |
|--|-----------------|-------------|-----------------|---|---|--|---|--|---|---|---|--|
| <table border="1"> <tr> <th>Description</th> <th>Priority points</th> </tr> <tr> <td>Mostly in non-developed area – little cultural impact</td> <td>0</td> </tr> <tr> <td>Mostly residential impacts</td> <td>1</td> </tr> <tr> <td>Impacts to public boat access or beach as well as to residents</td> <td>2</td> </tr> <tr> <td>Impacts to commercial operations (marinas, state beach, motel/restaurant beaches/docks)</td> <td>3</td> </tr> </table> | | Description | Priority points | Mostly in non-developed area – little cultural impact | 0 | Mostly residential impacts | 1 | Impacts to public boat access or beach as well as to residents | 2 | Impacts to commercial operations (marinas, state beach, motel/restaurant beaches/docks) | 3 | |
| Description | Priority points | | | | | | | | | | | |
| Mostly in non-developed area – little cultural impact | 0 | | | | | | | | | | | |
| Mostly residential impacts | 1 | | | | | | | | | | | |
| Impacts to public boat access or beach as well as to residents | 2 | | | | | | | | | | | |
| Impacts to commercial operations (marinas, state beach, motel/restaurant beaches/docks) | 3 | | | | | | | | | | | |
| | | | | | | | | | | | | |
| TREATMENT TYPE | | | | | | | | | | | | |
| <table border="1"> <tr> <th>Description</th> <th>Priority points</th> </tr> <tr> <td>Herbicide only</td> <td>0</td> </tr> <tr> <td>Herbicide followed by non-chemical maintenance efforts (hand pulling, diving, etc)</td> <td>1</td> </tr> <tr> <td>Non-herbicide treatment (harvesting, barrier screens,etc)</td> <td>2</td> </tr> <tr> <td>New innovative approach</td> <td>3</td> </tr> </table> | | Description | Priority points | Herbicide only | 0 | Herbicide followed by non-chemical maintenance efforts (hand pulling, diving, etc) | 1 | Non-herbicide treatment (harvesting, barrier screens,etc) | 2 | New innovative approach | 3 | |
| Description | Priority points | | | | | | | | | | | |
| Herbicide only | 0 | | | | | | | | | | | |
| Herbicide followed by non-chemical maintenance efforts (hand pulling, diving, etc) | 1 | | | | | | | | | | | |
| Non-herbicide treatment (harvesting, barrier screens,etc) | 2 | | | | | | | | | | | |
| New innovative approach | 3 | | | | | | | | | | | |
| TREATMENT HISTORY | | | | | | | | | | | | |
| <table border="1"> <tr> <th>Description</th> <th>Priority points</th> </tr> <tr> <td>Treated within last two years</td> <td>0</td> </tr> <tr> <td>Not treated within last two years and no request for funds</td> <td>1</td> </tr> <tr> <td>Not treated within last two years; funds requested but not available</td> <td>2</td> </tr> <tr> <td>Site not previously treated</td> <td>3</td> </tr> </table> | | Description | Priority points | Treated within last two years | 0 | Not treated within last two years and no request for funds | 1 | Not treated within last two years; funds requested but not available | 2 | Site not previously treated | 3 | |
| Description | Priority points | | | | | | | | | | | |
| Treated within last two years | 0 | | | | | | | | | | | |
| Not treated within last two years and no request for funds | 1 | | | | | | | | | | | |
| Not treated within last two years; funds requested but not available | 2 | | | | | | | | | | | |
| Site not previously treated | 3 | | | | | | | | | | | |

| | | |
|--|------------------------|--|
| LOCAL SUPPORT | | |
| Description | Priority points | |
| Propose to provide minimum 50 % match | 0 | |
| Provide 65% match | 1 | |
| Provide 80% match | 2 | |
| Provide 90% match | 3 | |
| TOTAL POINTS | | |

§ 487:18 Project Prioritization. – Project approval shall be based upon prioritization factors to be established by rules adopted under RSA 541-A. Such rules shall give first priority for expenditure of available funds to the eradication of new infestations of exotic aquatic weeds pursuant to RSA 487:17, II(b) and second priority to all reasonable measures to control exotic aquatic weeds. Otherwise, preference shall be given to lakes that have public access or that serve as a public drinking water supply. Implementation measures shall be based upon an assessment of potential success, technical feasibility, practicability, and cost effectiveness. Restoration and preservation projects shall include watershed management plans to control and reduce incoming nutrients wherever possible through best management practices. Repeated short-term solutions shall be discouraged where long-term solutions are feasible and cost effective. Treatments shall be designed to minimize any adverse effect upon fish and wildlife, their habitats, and the environment.

Source. 1990, 143:2, eff. June 18, 1990.